

Action Memorandum

*Time-Critical Removal Action For
Installation Restoration Site 5 – Unit 2
Naval Air Station North Island
San Diego County, California*

July 28, 1999

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Acronyms and Abbreviations

APCD	Air Pollution Control District
ARAR	applicable or relevant and appropriate requirement
BNI	Bechtel National, Inc.
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAH	chlorinated aliphatic hydrocarbon
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
COPC	chemical of potential concern
CPT	cone penetrometer test
DCE	dichloroethene
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DON	Department of Navy
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
H ₂	hydrogen
HRS	Hazard Ranking System
HWF	Hazardous Waste Facility
IAS	Initial Assessment Study
IR	Installation Restoration
Jacobs	Jacobs Engineering Group, Inc.
KMnO ₄	potassium permanganate
LDR	Land Disposal Restriction
mg/kg	milligrams per kilogram
MNA	monitored natural attenuation
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
PAL	Preliminary Action Level
PCE	tetrachloroethene
Pd	palladium
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act

Acronyms and Abbreviations (Cont.)

RDT&E	Research, Development, Test and Evaluation
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU	solid waste management unit
SWRCB	State Water Resources Control Board
TCA	trichloroethane
TCE	trichloroethene
TCRA	time-critical removal action
TiO ₂	titanium dioxide
USC	United States Code
VOC	volatile organic compound
µg/L	micrograms per liter

ACTION MEMORANDUM

Department of Navy
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, California 92132

Subject: Action Memorandum for Removal Action at Installation
Restoration Site 5, Unit 2, Naval Air Station North Island,
San Diego County, California

Site Status: Non-National Priority List

Category of Removal: Time Critical Removal Action

CERCLIS Identification: CA 7170090016

Site Identification: Naval Air Station North Island, Installation Restoration Site
5, Unit 2

1.0 PURPOSE

This Action Memorandum documents, for the Administrative Record, the Department of the Navy's (DON) decision to undertake a time-critical removal action (TCRA) at Installation Restoration (IR) Program Site 5, Unit 2, located at Naval Air Station (NAS) North Island in San Diego County, California. [Figures 1](#) and [2](#) in Attachment A show the location of NAS North Island and IR Site 5, Unit 2, respectively.

The Department of Defense (DoD) has the authority to undertake Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions, including removal actions, under 42 United States Code (USC) §9604; 10 USC §2705; Executive Order 12580; and Title 40, Code of Federal Regulations (CFR), Section 300.415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The TCRA for IR Site 5, Unit 2 addresses the volatile organic compound (VOC) impacted groundwater at the site. The removal action will mitigate the VOC groundwater plume by the use of *in-situ* chemical oxidation. Post-remediation monitoring and testing will be performed to document the effectiveness of the removal action.

This Action Memorandum was prepared in the context of the IR Program, which is designed in part to evaluate, and remediate if necessary, contamination caused by hazardous substances, pollutants, or contaminants, pursuant to CERCLA of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. This document is intended to satisfy a portion of the IR Program requirements.

2.0 SITE CONDITIONS AND BACKGROUND

This section is intended to satisfy the requirements of CERCLA for a description of site background and conditions.

2.1 SITE DESCRIPTION

NAS North Island is located in San Diego County, California, west of the city of Coronado, on the tip of the Silver Strand Peninsula (Figure 1, Attachment A). NAS North Island is surrounded by water on three sides: the Pacific Ocean to the south and the San Diego Bay to the west and north. NAS North Island is accessible by land to the east through the city of Coronado from San Diego via the Coronado Bay Bridge and from the city of Imperial Beach via the Silver Strand Highway, State Route 75. NAS North Island incorporates approximately 2,520 contiguous acres of land (Brown and Caldwell, 1983).

IR Site 5 is segregated into two units. Unit 1 corresponds to the former municipal landfill that was operated at IR Site 5 and is predominately overlain by the golf course. Unit 2 is the focus of this Action Memorandum and corresponds to the vicinity of the former hazardous waste disposal pits and the area of the VOC groundwater plume. Unit 2 is predominately located within the approach to the NAS North Island runway. Figure 2 in Attachment A illustrates the location, topography, and geographical features of IR Site 5 and the boundaries of Units 1 and 2.

IR Site 5, Unit 2 is located in the southeastern portion of NAS North Island near the western limit of the city of Coronado. IR Site 5, Unit 2 encompasses approximately 3½ acres and is located in the southwestern corner of IR Site 5, east of the intersection of Sherman and Rogers Road (Figure 2, Attachment A). The edge of a residential area of the city of Coronado is located approximately 1,700 feet to the east and the Pacific Ocean is located approximately 1,300 feet to the south of the IR Site 5, Unit 2, respectively. Crown Elementary School is located approximately 4,200 feet northeast of the center of the site. Land extending at least 1 mile to the north and west of the site is within the boundaries of NAS North Island.

Putting greens are located north of the VOC plume between two ponds and south of the VOC plume near the head of a stormwater drainage slough. This slough receives stormwater drainage and conveys it south to the Pacific Ocean.

2.1.1 SITE CHARACTERISTICS

Industrial operations began at NAS North Island in the 1920s, although the generation of significant quantities of waste did not begin until the 1940s, during World War II. World War II and the Korean War led to expansions at NAS North Island to support the war efforts, thereby increasing the generation of wastes. NAS North Island was expanded in the 1930s and 1940s by dredging sediments from the main channel and dock areas and depositing the hydraulic fill materials along the shorelines and shallow bays (or bights).

Between 1943 and 1945, IR Site 5 was constructed, as a solid waste disposal facility on fill materials placed in a former bay, known as the Spanish Bight.

Waste disposal activities commenced immediately after the construction of IR Site 5. IR Site 5 was operated as a cut-and-cover sanitary landfill and functioned as the only solid-waste disposal facility after the closure of the Old Spanish Bight Landfill (IR Site 2) in the early 1940s. An estimated 1,000 to 2,000 tons of hazardous waste (0.5 percent of the total quantity of the landfill debris) was disposed of at IR Site 5. An aerial photograph from 1948 indicates that landfill activity extended approximately 100 to 200 feet west of Rogers Road along "J" Road East, and shows two rectangular hazardous waste disposal pits. These former hazardous waste pits are believed to be the source of the groundwater contamination at IR Site 5, Unit 2 (Bechtel National, Inc. [BNI], 1998). Waste disposal activities ceased between 1965 and 1968, and the site was operated as a transfer station prior to the disposal of Navy wastes off base. The operation of the transfer station at Site 5 ceased in 1983. Portions of IR Site 2 were converted to a golf course between 1983 and 1984, and are still in use today.

2.1.2 REMOVAL SITE EVALUATION

Numerous investigations have been conducted at IR Site 5 to trace the history of waste disposal activities at the site and to delineate areas of soil and groundwater contamination. The first investigation was conducted in 1983 and consisted of interviews and records reviews to identify hazardous waste sites on NAS North Island and to assess their potential impact on human health and the environment. Details of the investigation are provided in the Initial Assessment Study (IAS) of NAS North Island (Brown and Caldwell, 1983). This study was performed to identify and assess sites posing a potential threat to human health or the environment from past handling of hazardous materials. The IAS concluded that a significant volume of hazardous waste was disposed at the site during the operation of the landfill.

In 1985, gasoline odors were detected in borings and test pits excavated for a foundation study for the proposed Golf Course Clubhouse located on the former IR Site 5, Unit 1 municipal landfill. Sampling and analysis of soil from these test pits and borings showed that landfill gases were migrating from the subsurface soils (Harding Lawson, 1988b). Based on these results, landfill debris was removed and the foundation design for the clubhouse was modified to prevent the permeation of gases into the building.

In response to recommendations presented in the 1983 IAS (Brown and Caldwell, 1983), Harding Lawson Associates in 1988 performed a Solid Waste Assessment Test and a Solid Waste Air Quality Assessment Test (Harding Lawson, 1988a). The purpose of this study was to assess the potential release of landfill contaminants into soils, groundwater, and air. The analysis of water samples collected from seven monitoring wells at locations surrounding the inactive landfill revealed the presence of VOCs in groundwater outside of landfill boundaries. The off-site migration of landfill gases was not detected.

In 1988, the Navy Public Works Center at NAS North Island was issued a federal Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility (HWF) permit (EPA ID# 7170090016) for a hazardous waste treatment and storage facility. As required by the HWF permit, a RCRA Facility Assessment (RFA) was conducted and IR Site 5 was identified as a solid waste management unit under the permit. The RFA recommended that a Phase I RCRA Facility Investigation (RFI) be performed for IR Site 5.

Several studies were performed in 1995 under the IR Program for NAS North Island to provide information on stratigraphy, groundwater data, background concentrations of inorganic chemicals, and geologic structural data. A regional stratigraphic and structural correlation based on 31 cone penetrometer test (CPT) points identified continuous silt and clay layers within the Bay Point Formation (Science Applications International Corporation, 1995). A statistical evaluation of inorganic analyses of soil samples established standard background threshold concentrations of inorganic chemicals for NAS North Island (Jacobs Engineering Group Inc. [JEG], 1995) and a fracture trace analysis and seismic profile were used to determine historical land-use patterns and faults underlying IR Site 5 (JEG, 1995).

RFI sampling was conducted in 1995 through 1996 (BNI, 1998). As part of the first phase of the RFI for IR Site 5, the extent of the inactive landfill was determined through a combination of geophysical surveys, topographic map and aerial photograph interpretation, and interviews with present and former NAS North Island personnel. A soil-gas survey was also conducted in April and May 1995 to identify sources of methane and VOC contamination. Groundwater depths at the site were too shallow to permit accurate sampling of soil gas; therefore, the headspace of groundwater samples collected was used to assess the extent of VOC contamination at IR Site 5. The headspace results were used to delineate an area of elevated VOC and methane contamination that extended outside the boundaries of the former IR Site 5 landfill. Chlorinated aliphatic hydrocarbons (CAHs) identified as chemicals of potential concern (COPC) included tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE), and vinyl chloride. Benzene, toluene, ethylbenzene, and xylene (BTEX) and total volatile hydrocarbons were also detected in headspace samples collected.

The second phase of the RFI included additional CPT probe locations and soil sampling (BNI, 1998). The highest detected COPC concentration in soil was 400,000 mg/kg of cis-1,2-DCE. Additional VOCs detected at this location included 62,000 milligrams per kilogram (mg/kg) of TCE and 110,000 mg/kg of toluene. The location of these samples was coincident with the suspected location of the former hazardous waste pits. On the basis of groundwater elevation data collected in May 1996 and soil sampling depths, these contaminants were found to have migrated below the groundwater table. VOCs were detected at three other soil sampling locations within and downgradient of the suspected source area, but no VOCs were detected upgradient of the suspected source area.

Groundwater characterization during the second phase of the RFI included the installation and sampling of four groundwater monitoring wells in March 1996. Groundwater samples

also were collected from 15 borehole locations. All groundwater samples were analyzed for VOCs by United States Environmental Protection Agency (EPA) Method SW8260 and for semivolatile organic compounds (SVOCs) by EPA Method SW8270. The IR Site 5, Unit 2 groundwater contaminant plume was identified to be approximately 500 feet long by 300 feet wide, extending from the suspected source area to approximately 375 feet south of Sherman Road. The highest groundwater BTEX and CAH concentrations were observed near the locations of the former hazardous waste disposal pits, and these elevated concentrations were found to decrease to the southwest in the direction of groundwater flow. The highest VOC concentrations detected in groundwater were 13,000 micrograms per liter ($\mu\text{g/L}$) of cis-1,2-DCE, 11,000 $\mu\text{g/L}$ of TCE, 1,200 $\mu\text{g/L}$ of PCE, 48,000 $\mu\text{g/L}$ of vinyl chloride, and 5,490 $\mu\text{g/L}$ of total BTEX. The southern end of the plume underlies a heavily irrigated golf course green and terminates within 200 feet of a slough that conveys stormwater runoff and golf course irrigation water to the Pacific Ocean. The results of a numerical one-dimensional fate and transport model suggested the possibility that the groundwater VOC plume could discharge into the stormwater slough. A tidal-influence study determined that groundwater elevations in the site vicinity are minimally affected by tidal variations (BNI, 1998).

In 1997 and 1998, Parsons Engineering Science installed ten additional monitoring wells at IR Site 5 Unit 2. Water samples were collected on a quarterly basis from these wells and those previously constructed by BNI and were analyzed for VOCs and geochemical parameters. The data obtained were used to evaluate whether monitored natural attenuation (MNA) of dissolved fuel and chlorinated solvents in the groundwater is occurring at the site (Parsons, 1999). The results of this study indicate that natural attenuation of the VOC groundwater plume is occurring via reductive dechlorination. However, the study concluded that natural attenuation alone cannot assure that dissolved concentrations of VOCs will not reach the slough at concentrations less than the water quality objectives specified in the California State Water Resources Control Board (SWRCB) Ocean Plan (SWRCB, 1995) and, therefore, recommended source removal.

2.1.3 RELEASES AND THREATENED RELEASES

The source of the VOC groundwater contamination is believed to be the two former rectangular hazardous waste disposal pits located in the northern portion of IR Site 5 along Sherman Road ([Figure 2](#), Attachment A). IR Site 5 was operated as a sanitary landfill between the early 1940's and 1965. As previously stated, it is estimated that approximately 1,000 to 2,000 tons of hazardous waste was disposed of at the site. The disposal of these wastes has resulted in the observed soil and groundwater contamination at IR Site 5, Unit 2.

- **Chemicals of Potential Concern:** The COPC at IR Site 5, Unit 2 are associated with the chemicals known or suspected of having been released to the environment. The Remedial Investigation (RI)/RFI Report (BNI, 1998), identifies the COPC and describes the process by which they were identified. The proposed TCRA is limited to the mitigation of VOC groundwater contamination by accomplishing source removal of the VOCs present in the soil and groundwater at the site.

- **Mechanisms for Releases:** Present and future releases and migration pathways are a function of the exposure pathways for the COPC to human and ecological receptors. The primary exposure pathways to marine organisms and human receptors are considered to be 1) contaminated groundwater mixing with seawater and 2) the discharge of contaminated groundwater as surface water into the nearby slough. The residual soil and groundwater contamination associated with the former waste disposal practices at the site may be continuing sources to the impacted groundwater at IR Site 5, Unit 2. The RI/RFI report (BNI, 1998) summarizes the potential human and ecological receptors:
 - **Potential Human Receptors:** Future potential receptors of the COPC in groundwater include persons participating in ocean water sports and the recreational angler.
 - **Potential Ecological Receptors:** There is little terrestrial plant and wildlife use of IR Site 5 because of its small size, constant disturbance from vehicles and aircraft, and weed abatement efforts. However, birds, fish, and inter-tidal invertebrates that live near the site may be impacted by the COPC detected in the groundwater if contaminants migrate to the slough.

2.1.4 NATIONAL PRIORITY LIST STATUS

The project site is not a National Priorities List (NPL) site.

2.1.5 MAPS, PICTURES, AND OTHER GRAPHIC REPRESENTATIONS

The following figures are included in Attachment A:

- [Figure 1 - Vicinity and Project Location Map](#)
- [Figure 2 - Summary of VOC Groundwater Analytical Data](#)
- [Figure 3 - Technology Matrix](#)
- [Photographic Log](#)

2.2 OTHER ACTIONS TO DATE

2.2.1 PREVIOUS ACTIONS

No previous response actions have been or are being conducted at IR Site 5, Unit 2. Previous investigations conducted at the site are discussed in [Section 2.1.2](#) of this Action Memorandum.

2.2.2 CURRENT ACTIONS

Current actions at IR Site 5 consist of groundwater monitoring which is being performed as a post-closure maintenance activity for the inactive landfill. Activities being conducted

at IR Site 5 are being performed in a manner consistent with the HWF permit. In addition, activities conducted at IR sites is consistent with the Navy IR program manual and other relevant requirements and laws.

As the lead federal agency, the Navy has initiated a community relations effort, in coordination with the Department of Toxic Substances Control (DTSC), the lead state agency, to solicit community input and keep the community informed of the status of the proposed actions. A Restoration Advisory Board (RAB) has also been established for NAS North Island to allow a wider range of community involvement. The RAB generally meets on a monthly basis.

2.3 FEDERAL, STATE, AND LOCAL AUTHORITIES' ROLES

2.3.1 FEDERAL, STATE, AND LOCAL ACTION TO DATE

Federal Executive Order 12580 delegates, to the DoD, the President's authority to undertake CERCLA response actions. Congress further outlined this authority in its Defense Environmental Restoration Program (DERP) amendments, which are contained in 10 USC §2701-2705. Both CERCLA Section 120(f) and 10 USC §2705 require the DON to ensure that State and local officials be given the opportunity to review and comment in a timely manner on response actions at Navy facilities. CERCLA Section 120 further requires the DON to apply State removal and remedial action law requirements at its facilities. The Federal Facility Site Remediation Agreement (SWDIV, 1999b) for NAS North Island is the administrative tool for regulating the cleanup of this site.

2.3.2 POTENTIAL FOR CONTINUED FEDERAL AND STATE/LOCAL RESPONSE

The DTSC and the Regional Water Quality Control Board (RWQCB) (San Diego Region) have provided technical advice, oversight, and assistance throughout the investigation phase of IR Site 5 and will continue to do so throughout the IR Program process.

3.0 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

In accordance with the NCP, the following factors must be considered in determining the appropriateness of performing a removal action (40 CFR §300.415[b][2][i-vii]):

- Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations, animals, or food chains.
- Actual or potential contamination of drinking water supplies or sensitive ecosystems.
- Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release.

- High levels of hazardous substances or pollutants or contaminants in soils, largely at or near the surface, which may migrate.
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.
- Threat of fire or explosion.
- Other situations or factors that may pose threats to public health or welfare or the environment.
- Availability of other appropriate Federal or State response mechanisms to respond to the release.

3.1 THREATS TO PUBLIC HEALTH OR WELFARE

Several COPC are present in the groundwater at concentrations in excess of the human-health protection water quality objectives promulgated by the CWRQB, RWQCB, and EPA. Therefore, of the threats listed in [Section 3.0](#), with respect to the impacted groundwater at IR Site 5, Unit 2, the only threat to public health and welfare that applies to the site is:

- Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations.

3.2 THREATS TO THE ENVIRONMENT

Several COPC are present in the groundwater at concentrations in excess of the aquatic life protection water quality objectives promulgated by the CWRQB, RWQCB, and EPA. Therefore, of the threats listed in [Section 3.0](#), with respect to the impacted groundwater at IR Site 5, Unit 2, threats to the environment that apply to the site are:

- Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations.
- Actual or potential contamination of sensitive ecosystems.

4.0 ENDANGERMENT DETERMINATION

The risk evaluation presented in the RI/RFI report (BNI, 1998) and other information contained in the administrative record ([Attachment B](#)) demonstrate that current conditions at the site present a potential future threat to the aquatic ecosystem, public health and the environment. Actual or threatened releases of hazardous substances, pollutants, and contaminants from this site, if not addressed by implementing the TCRA selected in this Action Memorandum, may present a substantial future endangerment to public health or the environment. The contamination at the site presents a future endangerment because of the following:

- Future potential exposures to hazardous substances or pollutants or contaminants by nearby populations, animals, or food chains.
- Future potential contamination of sensitive ecosystems.
- Future potential exposure of hazardous substances or pollutants to ecological receptors in the Pacific Ocean and the inter-tidal zone via groundwater, based on known impacts to groundwater.

5.0 PROPOSED ACTIONS AND ESTIMATED COSTS

The following section describes the specific tasks involved in the TCRA to respond to the public health, welfare, and environmental threats at the site. Also included is a discussion of the extent of contamination; the proposed TCRA description; a description of alternative technologies considered; the evaluation of the alternatives; applicable or relevant and appropriate requirements (ARARs); project schedule; and estimated costs.

5.1 EXTENT OF CONTAMINATION

The findings and conclusions presented in the RI/RFI report (BNI, 1998) and the monitored natural attenuation study (Parsons, 1999) provide sufficient information for determining the appropriate removal action for the VOC-impacted groundwater at IR Site 5, Unit 2. Additional information regarding the extent and nature of the impacted groundwater at the site would not preclude the proposed TCRA from being initiated.

The lateral distribution of VOC-impacted groundwater at IR Site 5, Unit 2 ([Figure 2, Attachment A](#)) appears to be controlled by groundwater flow rather than by physical boundaries. The vertical extent of the VOC-impacted groundwater appears to be largely restricted to the hydraulic fill aquifer above the fine-grained Spanish Bight sediments. The Spanish Bight sediments are present approximately 15 to 20 feet below ground surface.

5.2 PROPOSED ACTION SCOPE

The scope of the planned TCRA is to achieve source area reduction of chlorinated aliphatic hydrocarbons, particularly vinyl chloride, cis-1,2-DCE, trans-1,2-DCE, TCE, and 1,1-DCA, to ensure that natural attenuation will be an effective remedy for the VOC-impacted groundwater at IR Site 5, Unit 2. Remediation of petroleum hydrocarbon compounds, semivolatile organic compounds (SVOCs), and metals are not a part of this TCRA.

5.3 PROPOSED ACTION DESCRIPTION

The response action selected in this Action Memorandum to mitigate threats to public health, welfare, and the environment is remediation of the VOC groundwater plume source area by *in-situ* chemical oxidation. Chemical oxidation is a process in which the oxidation state of a contaminant is increased while the oxidation state of the reactant is lowered. This response action will include the following activities:

- Laboratory bench tests using soil and groundwater samples collected from IR Site 5, Unit 2 to develop preliminary operational parameters (e.g., chemical concentrations and injection rates) to be used in the pilot test.
- Pilot tests to develop full-scale design parameters (e.g., rate of chemical oxidation, well spacing, and refinement of the operational parameters determined in the bench test).
- Remediation system design and equipment procurement.
- Construction of injection wells, conveyance piping system, and chemical storage/mixing area.
- Pre-injection groundwater sampling and analysis.
- Injection of the chemical oxidants.
- Groundwater sampling and analysis.
- Preparation of removal action closure report.
- Post-treatment groundwater sampling and analysis.

A detailed description of the work to be performed at the site under the TCRA is presented in the [Removal Action Workplan](#) (OHM, 1999).

5.4 CONTRIBUTION TO REMEDIAL PERFORMANCE

The TCRA will contribute to the efficient regulatory closure of the IR Site 5, Unit 2 and the reduction of future potential risk to human and environmental receptors by mitigating the VOC groundwater plume source area. However, since the removal action is limited to the mitigation of the VOC-impacted groundwater, further action (i.e., subsequent removal actions and/or analyses) may be required to facilitate regulatory site closure.

5.5 DESCRIPTION OF ALTERNATIVE TECHNOLOGIES

Initially, 18 remedial technologies were evaluated to determine their potential effectiveness to adequately mitigate the VOC groundwater plume source area at IR Site 5, Unit 2. Based on this preliminary evaluation, four technologies were determined to be possible remedial options capable of achieving the TCRA objectives ([Figure 3](#), Attachment A):

- Alternative 1: Permeable reactive barrier.
- Alternative 2: *In-situ* chemical oxidation by Fenton's reagent.
- Alternative 3: Air sparging and soil vapor extraction.
- Alternative 4: Enhanced soil mixing.

As summarized in [Table 5-1](#), these remedial alternatives were further evaluated in accordance with the following criteria:

- **Effectiveness:** The degree to which an alternative reduces toxicity, mobility, or volume through treatment; minimizes risks and provides long-term protection; complies with ARARs; minimizes short-term impacts; and achieves timely protection.
- **Implementability:** The technical feasibility and availability of the technologies each alternative would employ.
- **Cost:** Alternatives providing effectiveness and implementability similar to that of another alternative, but at a greater cost, may be eliminated.

5.5.1 OVERVIEW OF ALTERNATIVES

[Table 5-1](#) presents a summary of the detailed analysis of each remedial alternative considered capable of achieving the removal action objective including the primary components; advantages and disadvantages; effectiveness; implementability; and approximate cost. A brief summary of each alternative is presented below.

- **Alternative 1 – Permeable Reactive Barrier:** This technology involves the placement of a permeable wall of zero valent metal (typically iron) down-gradient of the contaminated groundwater plume. Reactive walls are typically installed by shoring and excavation or continuous trenching. Impermeable barriers (interlocking sheet piles or slurry walls) can be constructed to help direct the impacted groundwater to the permeable reactive treatment zone (a.k.a., funnel-and-gate system). As the VOC-impacted groundwater passes through the treatment zone, the zero valent metal acts as a catalyst to facilitate the removal of the halogenated substituents from the organic compounds under oxygen limited conditions. The resulting compounds that pass through the treatment zone are less toxic and may be mineralized by subsurface microorganisms.
- **Alternative 2 - In-situ Chemical Oxidation by Fenton's Reagent:** This technology is accomplished by creating a Fenton-type reaction in the subsurface by injecting hydrogen peroxide (an oxidizer), ferrous sulfate (a catalyst), and possibly acid (hydrochloric, phosphoric, sulfuric, or acetic acid) for pH treatment into the contaminated aquifer. The catalyst converts hydrogen peroxide to hydroxyl radicals, which in turn oxidize petroleum and/or chlorinated hydrocarbon contaminants to carbon dioxide, water and chloride ions.

The hydroxyl free radical generated by Fenton's reagent is a powerful, non-selective oxidant. Oxidation of an organic compound by Fenton's reagent is a rapid and exothermic (heat-producing) reaction and 100% mineralization is generally complete in minutes. Intermediate compounds produced during the reaction are primarily naturally occurring carboxylic acids. The end products of oxidation are primarily carbon dioxide, water, and chloride. The injected reagents do not adversely affect

the aquifer with the exception of the temporal effects of elevated pH (during acid treatment) and iron precipitation.

- **Alternative 3 – Air Sparging and Soil Vapor Extraction:** Air sparging involves the injection of air, via injection wells, into the saturated zone to promote the volatilization of the VOCs in the groundwater. The vapors generated from air sparging are collected through a soil vapor extraction (SVE) system to maximize the amount of contaminants captured and to control the subsurface air flow thereby preventing contaminated soil vapor from migrating to previously uncontaminated areas. SVE is achieved by inducing airflow through the soil using vacuum extraction vents installed in the vadose zone. It will be necessary to treat the extracted vapors prior to release to the atmosphere. The most common off-gas treatment technologies include thermal incineration, catalytic oxidation, and granular activated carbon adsorption.
- **Alternative 4 – Enhanced Soil Mixing:** This technology involves the use of one or more large diameter auger blades to treat the contaminated aquifer. During the mixing of the aquifer, steam is injected through nozzles located on the auger flights. The steam injection is intended to elevate the temperature of the aquifer and strip the VOCs. The VOC laden air is captured in a shroud and properly treated.

5.5.2 EFFECTIVENESS OF ALTERNATIVES

Effectiveness was evaluated on the alternative's ability to mitigate identified risks; compliance with ARARs; short-term effectiveness; and the reduction in mobility, volume, and toxicity of COPCs.

- **Alternative 1 – Permeable Reactive Barrier:** This technology could effectively treat the VOC-impacted groundwater and control plume without any energy input and minimal maintenance. Due to its passive nature, the primary disadvantages associated with this technology are long treatment times (several years) and costs associated with long term monitoring. Installation of the reactive barrier will require extensive excavation thereby resulting in significant disruption to the site.
- **Alternative 2 – *In-situ* Chemical Oxidation by Fenton's Reagent:** Compared to the other alternatives, this alternative could effectively treat the VOC-impacted groundwater in the most rapid manner with the least site disruption. *In-situ* chemical oxidation is a relatively new technology and has successfully been employed elsewhere. However, the geochemistry (primarily alkalinity) of the contaminated aquifer may reduce the effectiveness of the oxidation of the organic contaminants. Therefore, bench scale or pilot tests are required to provide the basis for engineering design of the treatment system.
- **Alternative 3 – Air Sparging and Soil Vapor Extraction:** At other sites on NAS North Island, air sparging and SVE have proven to be successful in removing VOCs from groundwater and the vadose zone. The soil conditions at the site and the range of concentrations are amenable to air sparging; however, the shallow depth to

groundwater (on the order of 5 feet below ground surface) represents a technical challenge to the implementation of this technology. Therefore, a pilot test is required to evaluate the effectiveness of the technology at this site and to provide the basis for engineering design of the system.

- **Alternative 4 – Enhanced Soil Mixing:** This technology could effectively treat the VOC-impacted groundwater. The primary disadvantages associated with this technology are site disruption during treatment and potential impact to landing planes due to the height of the necessary construction equipment.

Alternative 3 is considered the least effective followed by Alternative 4. Alternatives 1 and 2 are ranked equally in regard to effectiveness. Alternative 2 will generate the fewest impacts and will remediate the VOC-impacted groundwater in the shortest time. Alternatives 1 and 4 will result in significant disruption to the site.

5.5.3 IMPLEMENTABILITY OF ALTERNATIVES

Implementability was evaluated on technical feasibility; availability of technology, materials, and services; administrative feasibility; and State and community acceptance. Based on the minimal site disruption and impact to the nearby residents, the overall implementability of Alternative 2 is considered superior to the other alternatives. Alternatives 3 and 4 will require mitigation of VOC-laden vapors, and therefore, are expected to encounter difficult regulatory and public acceptance. Alternatives 1 and 4 will require substantial excavation and, due to the existing electrical utilities for aircraft approach lights, are expected to meet with difficulty in obtaining the required site approval from the Base.

5.5.4 COST OF ALTERNATIVES

A summary of the costs of the alternatives is presented in [Table 5-1](#). Alternative 2 poses the most cost-effective remediation.

5.6 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Section 300.4150(i) of the NCP provides that removal actions must attain ARARs to the extent practicable, considering the exigencies of the situation. Section 300.5 of the NCP defines applicable requirements as cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CERCLA site.

Section 300.5 of the NCP defines relevant and appropriate requirements as cleanup standards, standards of control and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, or contaminant, remedial

action, location, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site and are well-suited to the particular site.

In order to constitute an ARAR, a requirement must be substantive. Therefore, only substantive provisions of requirements identified as ARARs in this analysis will be considered ARARs. Section 121(e)(1) of CERCLA states that “No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on site, where such removal action is selected and carried out in compliance with this section.” Permits are considered procedural or administrative requirements. Provisions of generally relevant federal and state statutes and regulations that were determined to be procedural or non-environmental, including permit requirements, are not considered ARARs.

Only those standards that are identified by a state in a timely manner and are more stringent than federal requirements may be applicable or relevant and appropriate.

There are three types of ARARs. The first type includes “contaminant-specific” requirements. These ARARs set limits on concentrations of specific hazardous substances, contaminants, and pollutants in the environment. Examples of this type of ARAR are ambient water quality criteria and drinking water standards. The second type of ARAR includes location-specific requirements that set restrictions on certain types of activities based on site characteristics. These include restrictions on activities in wetlands, floodplains, and historic sites. The third type of ARAR includes action-specific requirements. These are technology-based restrictions that are triggered by the type of action under consideration. Examples of action-specific ARARs are RCRA regulations for hazardous waste treatment, storage, and disposal.

ARARs must be identified on a site-specific basis from information about specific chemicals at the site, specific features of the site location, and actions that are being considered as removal actions.

The IR Site 5, Unit 2 TCRA complies with pertinent substantive requirements of the following ARARs to the extent practicable, considering the exigencies of the situation.

- **Federal and State Chemical-Specific ARARs**

The objective of the TCRA is to removal a sufficient volume of VOCs from the soil and groundwater at IR Site 5, Unit 2, such that MNA coupled with Long Term Monitoring (LTM) will be sufficient to document that potential downgradient receptors will not be adversely affected. Therefore, federal and state cleanup goals are not considered applicable have not been established. Following the completion of the TCRA, groundwater modeling will be performed to predict if MNA and LTM will mitigate and control the IR Site 5, Unit 2 VOC plume before it reaches the slough. As a result, no federal chemical-specific ARARs have been identified.

- **Federal Location-Specific ARARs**

40 Code of Federal Regulations (CFR) 122.26(b)(14), which addresses water quality discharge requirements for stormwater drains under the National Pollutant Discharge Elimination System (NPDES), is relevant and appropriate for Site 5, Unit 2. A stormwater drain beneath the site that is subject to the requirements of NPDES General Permit No. CA00001, discharges to the slough on the southern shoreline of NAS North Island.

Both federal- and state-endangered and threatened species have been observed on and in the vicinity of NAS North Island (BNI, 1998). A state-threatened species, the burrowing owl, has been observed at Site 5, Unit 2, as well as the Nuttall's lotus, a California species of special concern. Therefore, the Endangered Species Act of 1973 is a potential ARAR for the IR Site 5, Unit 2 TCRA.

- **State Location-Specific ARARs**

The California Endangered Species Act set forth in Fish and Game Code Sections 2050-2068, 2070, 2080, and 2900-2096 was identified as a potential state ARAR. The referenced sections were determined to be procedural and non-substantive, with the exception of Section 2080, which prohibits the taking of endangered species and is relevant and appropriate for the Site 5, Unit 2 TCRA. The United States Congress has not waived sovereign immunity for state-endangered species protection requirements.

- **Federal Action-Specific ARARs**

The State of California has received RCRA authorization from the U.S. EPA for its hazardous waste management program (57 Federal Register 32726) and several requirements under the Hazardous and Solid Waste Amendments. These state requirements are considered potential federal ARARs because they are authorized under RCRA. During the TCRA waste materials (i.e., contaminated soil and groundwater) may be generated. The substantive provisions of the federally authorized RCRA program in the State of California are applicable in instances where that potential exists (22 CCR, Division 4.5, Chapter 11). Based on past testing of soil and groundwater at IR Site 5, Unit 2, soil generated during planned drilling and excavation activities and water produced during well development and groundwater sampling at this site may be hazardous. Offsite placement of hazardous wastes will require full compliance with land disposal restrictions (LDRs).

- **State Action-Specific ARARs**

During excavation activities, visible emissions and minor amounts of VOC emissions may be generated. As such, substantive requirements of the San Diego Air Pollution Control District (APCD) Rule 50(d)(1) pertaining to visible emissions and APCD Regulation IV, Rule 66, which addresses the discharge into the atmosphere of specified amounts of organic materials may be relevant and appropriate for the IR Site 5, Unit 2 TCRA.

Pursuant to 23 CCR 2510(g), landfills which are closed, abandoned, or inactive on the effective date of these regulations (November 1984) are not specifically required to be closed in accordance with Title 23 CCR, Article 8 requirements. The substantive requirements of 23 CCR 2510(g) pertaining to post-closure maintenance are applicable to IR Site 5. These requirements are being addressed as part of the IR program for IR Site 5 in its entirety and are outside the scope of this TCRA.

5.7 PROJECT SCHEDULE

The anticipated schedule for the TCRA is summarized below:

- | | |
|--|---------------------------------|
| • Completion of 30-day public review of Action Memorandum and Remedial Action Workplan | November 8, 1999 |
| • Submit final Action Memorandum and Remedial Action Workplan | November 28, 1999 |
| • Pre-construction activities | November 29 – December 24, 1999 |
| • Pilot test well construction | December 27 – January 7, 2000 |
| • Bench and pilot tests | January 10 – March 3, 2000 |
| • Preparation of construction drawings | March 6 – March 31, 2000 |
| • Mobilization of personnel and equipment | April 17 – April 21, 2000 |
| • Site Remediation | April 24 – July 17, 2000 |

5.8 ESTIMATED COSTS

The DON has made a present-worth cost estimate of the recommended TCRA (Alternative 2, *in-situ* chemical oxidation by Fenton's reagent). The estimated costs for the proposed action are as follows:

Initial Costs

Equipment Costs	\$1,000.
Construction Costs	776,000.
Management/Engineering Costs	84,000.

Operation and Maintenance Costs \$0.

Closeout Costs

Management/Engineering Costs	20,000.
Closure Report & Post Construction Distributive Costs	21,000.

Removal Action Total Cost \$902,000. ± \$90,000 (10 %)

Table 5-1
Summary of Detailed Analysis of Remedial Alternatives

Alt. No.	Technology Description	Components	Pros	Cons	Effectiveness	Implementability	Cost (\$)
1	Permeable reactive barrier	<ul style="list-style-type: none">• Install wall of zero metal valent down gradient of VOC plume• Confirmation sampling	<ul style="list-style-type: none">• Proven effective at other similar sites• Enhances anaerobic degradation of VOCs currently in progress• Low maintenance• Passive remediation• No disposal requirements	<ul style="list-style-type: none">• Relatively long treatment time• Permeable reactive barrier may clog due to precipitation• Excavation may require rerouting of utilities	<ul style="list-style-type: none">• VOCs in groundwater are transformed to less toxic compounds by reductive dechlorination	<ul style="list-style-type: none">• Technically and administratively implementable	\$2,070,000
2	<i>In-situ</i> chemical oxidation by Fenton's reagent	<ul style="list-style-type: none">• Bench and pilot tests• Chemical storage area• 53 injection wells• Inject acid for pH adjustment, if needed• Inject aqueous solution of ferrous sulfate and H₂O₂ (Fenton's reagent)• Confirmation sampling	<ul style="list-style-type: none">• Hydroxyl radical produced has a relatively high oxidizing potential (2.8 volts)• High percentage of contaminant reduction in weeks• Proven effective at other similar sites• Minimal site disruption	<ul style="list-style-type: none">• If not controlled, oxidation reaction may be violent• Requires acidification of the aquifer prior to injection• High alkalinity present in the groundwater maybe a scavenger to the hydroxyl radical and may require large volumes acetic or hydrochloric acid• Will disrupt reductive dechlorination of VOCs currently in progress• pH of groundwater may be temporarily lowered below the RWQCB's Ocean Plan water quality objective	<ul style="list-style-type: none">• VOCs in groundwater are transformed to less toxic compounds by chemical oxidization	<ul style="list-style-type: none">• Technically implementable• Pilot test needed to determine design parameters for construction of full-scale <i>in-situ</i> treatment system.	\$992,000
3	Air sparging and soil vapor extraction	<ul style="list-style-type: none">• Vacuum blower• Air compressor• Thermal oxidizer• Scrubber• 48 Air injection wells• 22 SVE wells• Surface and subsurface piping• Fill placement• Liner	<ul style="list-style-type: none">• Aggressive removal of VOCs from the vadose zone and groundwater• Proven technology provided appropriate conditions exist	<ul style="list-style-type: none">• Expensive above ground treatment may be required• Shallow water table may require fill placement and liner• Small quantities of VOCs may be released to the atmosphere• Will disrupt reductive dechlorination of VOCs currently in progress	<ul style="list-style-type: none">• Air sparging is a mass transfer process that removes VOCs from the groundwater and transfers them to the vapor phase• SVE creates a negative pressure in the unsaturated zone through a series of wells to capture the vapor plume created by air sparging	<ul style="list-style-type: none">• Administratively implementable• Based on further analysis, shallow vadose zone may eliminate this technology	\$1,562,000
4	Enhanced soil mixing	<ul style="list-style-type: none">• Large diameter auger rig• Thermal and chemical treatment• Confirmation sampling	<ul style="list-style-type: none">• Treats impacted soil and groundwater• Rapid treatment time• No maintenance	<ul style="list-style-type: none">• Excavation may require rerouting of utilities• Mast of soil mixing rig may be impact flight approach	<ul style="list-style-type: none">• Large diameter auger rig to treat contaminated aquifer and groundwater.	<ul style="list-style-type: none">• Technically and administratively implementable	\$2,053,000

Explanation:

H₂O₂

RWQCB

SVE

VOCs

Hydrogen peroxide

Regional Water Quality Control Board

Soil vapor extraction

Volatile organic compounds

6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If action should be delayed or not taken, human and ecological receptors may be exposed to the VOC-impacted groundwater. The groundwater contamination will most likely spread from the site to nearby areas (including the slough) as a result of groundwater flow and surface water infiltration. This spread of contamination would result in a future potential health risk to the exposed population. Additionally, continued contaminant migration from the soil to the groundwater and surface water may pose risks to ecological receptors.

If the action should be delayed or not taken, contamination will be allowed to continue to migrate and potentially result in a greater volume of material to be remediated. This will result in increased treatment costs.

7.0 PUBLIC INVOLVEMENT

The Navy held a kickoff meeting for this TCRA on May 28, 1999. Representatives of the DTSC and San Diego RWQCB attended this meeting. In addition, the Restoration Advisory Board (RAB) was notified of this planned TCRA at the monthly RAB meeting held on May 20, 1999. This Action Memorandum will also be public noticed.

A letter requesting the identification of ARARs for the IR Site 5, Unit 2 TCRA was sent to DTSC on May 5, 1999.

The Administrative Record resides at the Environmental Technical Library, Southwest Division Naval Facilities Engineering Command, 1220 Pacific Highway, Building 129, San Diego, CA 92132-5190. The point of contact is Ms. Diane Silva at 619/532-3676. A copy of the Administrative Record index for this TCRA can also be found in Attachment B of this Action Memorandum. A copy of this Action Memorandum and key Administrative Record documents for this TCRA are available at the information repository located at the Coronado Public Library. The address and point of contact are:

City of Coronado Public Library	POC: Ms. Vanessa Owynne
640 Orange Avenue	619/522-7390
Coronado, CA 92118	

8.0 OUTSTANDING POLICY ISSUES

There are no outstanding policy issues associated with the removal action for IR Site 5, Unit 2 at this time.

9.0 RECOMMENDATIONS

The Action Memorandum was prepared in accordance with current EPA and DON guidance documents for TCRAs under CERCLA. The purpose of this Action Memorandum was to identify and analyze removal actions to address VOC-impacted groundwater at IR Site 5, Unit 2, NAS North Island. Four alternatives were identified, evaluated, and ranked. These alternatives were (in the order of ranking with the most attractive first):

- Alternative 2: *In-situ* chemical oxidation by Fenton's reagent.
- Alternative 1: Permeable reactive barrier.
- Alternative 4: Enhanced soil mixing.
- Alternative 3: Soil vapor extraction and air sparging.

Based on the comparative analysis of the TCRA presented in this Action Memorandum, the recommended removal action is Alternative 2. This alternative is recommended because it will minimize the spread of groundwater contamination by removing the source of VOCs in the soil and groundwater; reduce future human and ecological exposure to the VOC-impacted groundwater; and reduce the probability of discharge of contaminated surface water into the slough.

This decision document represents the selected TCRA for IR Site 5, Unit 2 at NAS North Island, San Diego County, California, developed in accordance with CERCLA, as amended SARA and is consistent with the NCP. This decision is based on the Administrative Record for the site. Approval of the Action Memorandum is granted by signing below.

D.R. O'Brien
Captain, United States Navy
Commanding Officer
Naval Air Station North Island

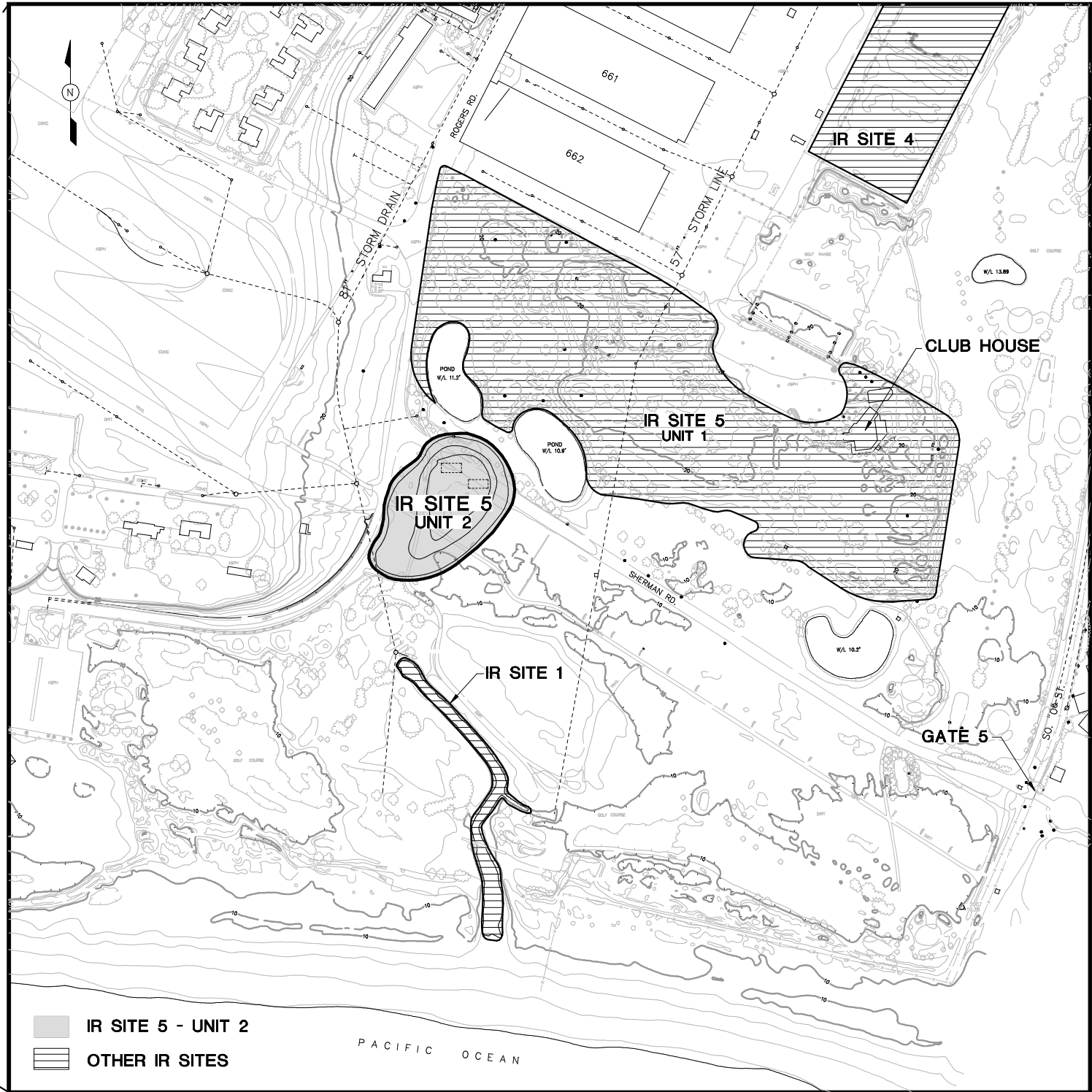
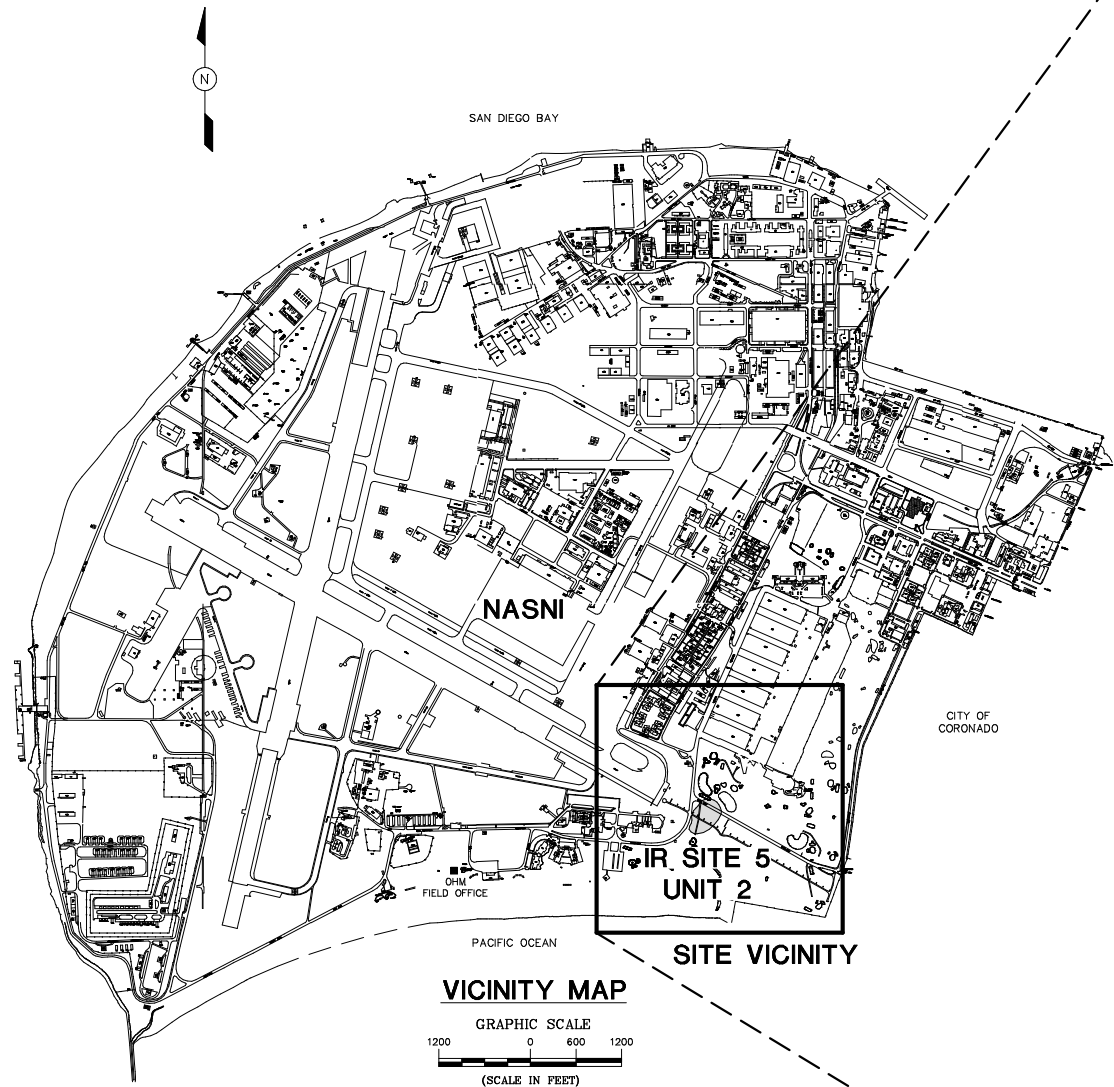
Date

ATTACHMENT A

FIGURES AND PHOTOGRAPHS

I.N. 1, DWG. NAME: SW6917F1-1.DWG PLOT @ FIT DATE: 7-23-99 J.B. MOSS, SR.

Reference:
Rick Engineering, 1994
Bechtel National, Inc. 1996
Parsons Engineering Science, Inc. 1995

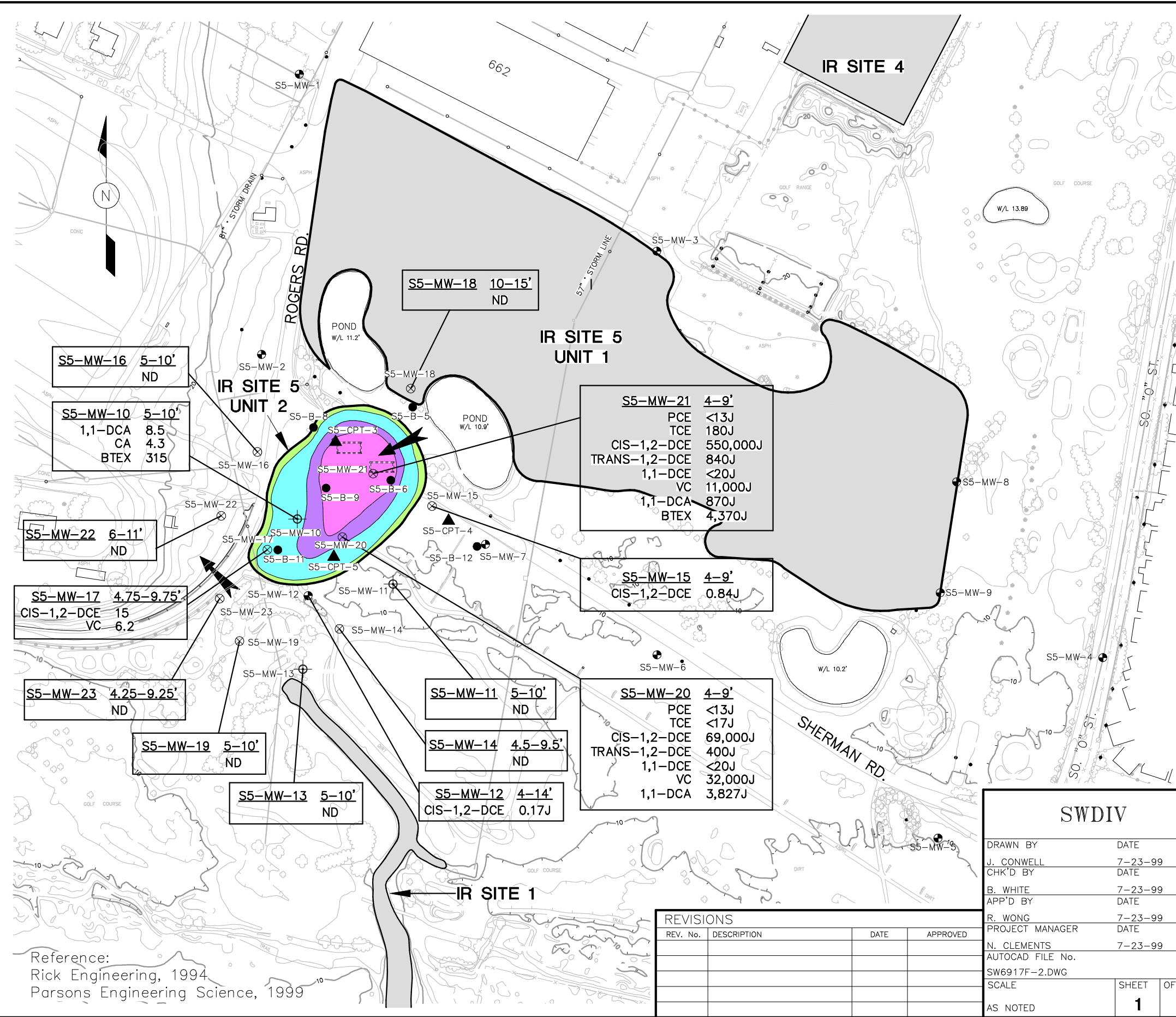


REVISIONS			
REV. No.	DESCRIPTION	DATE	APPROVED

SWDIV			
DRAWN BY	J. CONWELL	DATE	7/23/99
CHK'D BY	B. WHITE	DATE	7/23/99
APP'D BY	R. WONG	DATE	7/23/99
PROJECT MANAGER	N. CLEMENTS	DATE	7/23/99
AUTOCAD FILE No. SW6917F1-1			
SCALE	AS NOTED	SHEET	1 OF 1

OHM Remediation Services Corp. A Subsidiary of OHM Corporation San Diego, California		
PROJECT LOCATION AND SITE MAP IR SITE 5 - UNIT 2		
NAVAL AIR STATION NORTH ISLAND SAN DIEGO COUNTY, CALIFORNIA DELIVERY ORDER 141 CONTRACT N68711-93-D-1459		
OHM PROJECT No. 779552	DRAWING No. FIGURE 1	REVISION 0

I.N. 10, DWG. NAME: SW6917F-2.DWG PLOT © FIT DATE: 7-23-99 J.B. MOSS, SR.



LEGEND:

10

ELEVATION IN FEET, DATUM MLLW

662

BUILDING OR STRUCTURE

GROUNDWATER FLOW DIRECTION

SUSPECTED FORMER DISPOSAL PONDS

1-10 ug/L TOTAL SELECTED VOCs

10-1,000 ug/L TOTAL SELECTED VOCs

1,000-100,000 ug/L TOTAL SELECTED VOCs

>100,000 ug/L TOTAL SELECTED VOCs

PHASE II DIRECT-PUSH BORING

PHASE II CONE PENETROMETER TEST POINT

MONITORING WELL INSTALLED BY
PARSONS ENGINEERING SCIENCE, INC.

MONITORING WELLS INSTALLED BY
BECHTEL NATIONAL, INC. MARCH 1996

ABBREVIATIONS:

VOC

VOLATILE ORGANIC COMPOUND

PCE

TETRACHLORETHENE

TCE

TRICHLOROETHENE

DCE

DICHLOROETHENE

VC

VINYL CHLORIDE

DCA

DICHLOROETHANE

CA

CHLOROETHANE

BTEX

BENZENE, TOLUENE, ETHYLBENZENE, XYLENES

MLLW

MEAN LOW LOWER WATER

J

DATA QUALIFIER INDICATING
ESTIMATED CONCENTRATION

ND

NOT DETECTED

NOTES:

1. SELECTED VOCs INCLUDE CHLORINATED ETHENES,
CHLORINATED ETHANES, AND BTEX.

2. ALL CONCENTRATIONS ARE IN MICROGRAMS
PER LITER (ug/L)

SCALE

0250500 FEET

Reference:
Rick Engineering, 1994
Parsons Engineering Science, 1999

REVISIONS			
REV. No.	DESCRIPTION	DATE	APPROVED

SWDIV

DRAWN BY

J. CONWELL

CHK'D BY

B. WHITE

APP'D BY

R. WONG

PROJECT MANAGER

N. CLEMENTS

AUTOCAD FILE No.

SW6917F-2.DWG

SCALE

AS NOTED

DATE

7-23-99

DATE

7-23-99

DATE

7-23-99

DATE

7-23-99

DATE

7-23-99

OHM Remediation Services Corp.

A Subsidiary of OHM Corporation

SAN DIEGO, CALIFORNIA

VOC GROUNDWATER RESULTS

IR SITE 5 - UNIT 2

NAVAL AIR STATION NORTH ISLAND

SAN DIEGO COUNTY, CALIFORNIA

DELIVERY ORDER 141

CONTRACT N68711-93-D-1459

OHM PROJECT No.

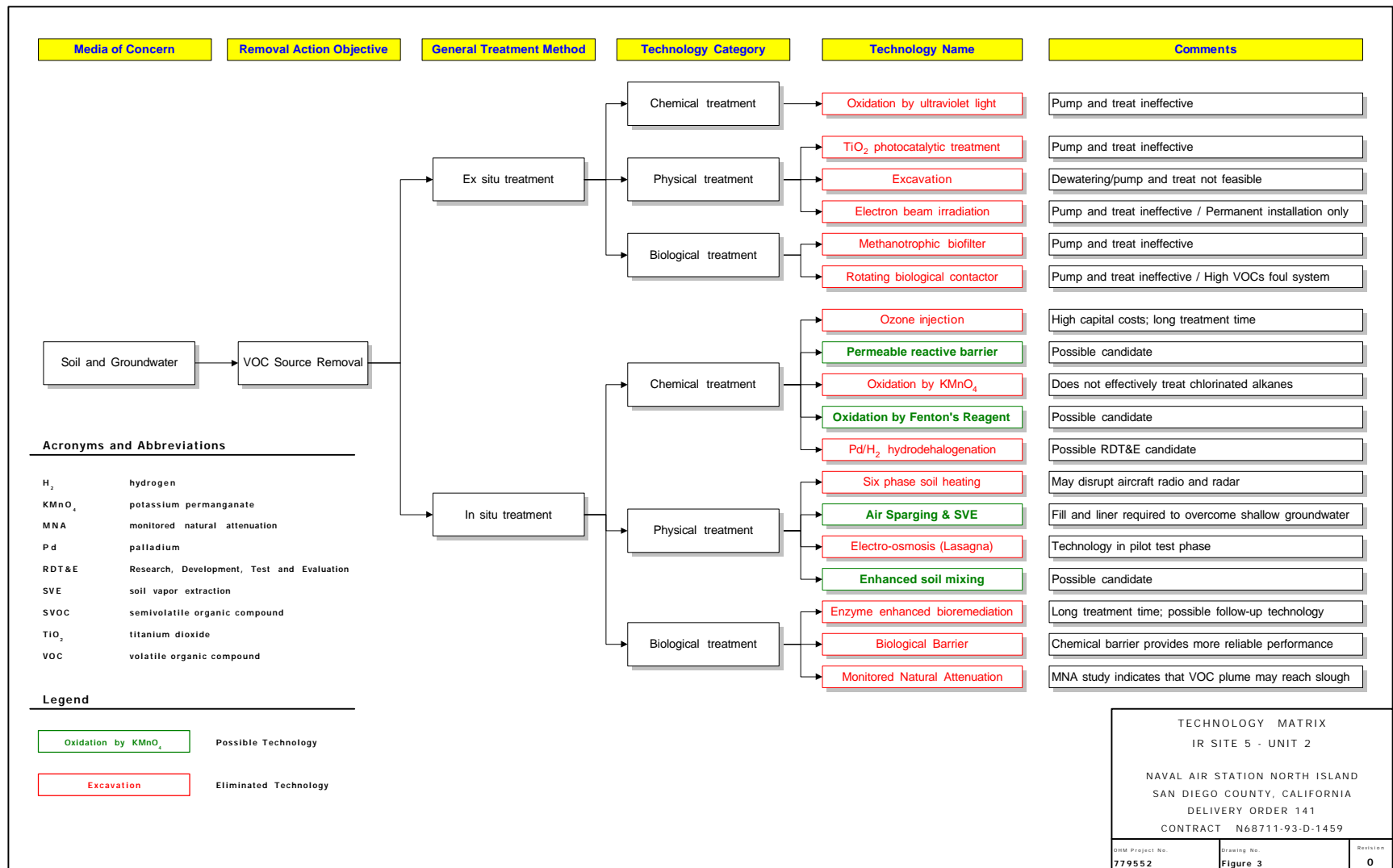
779552

DRAWING No.

FIGURE 2

REVISION

0



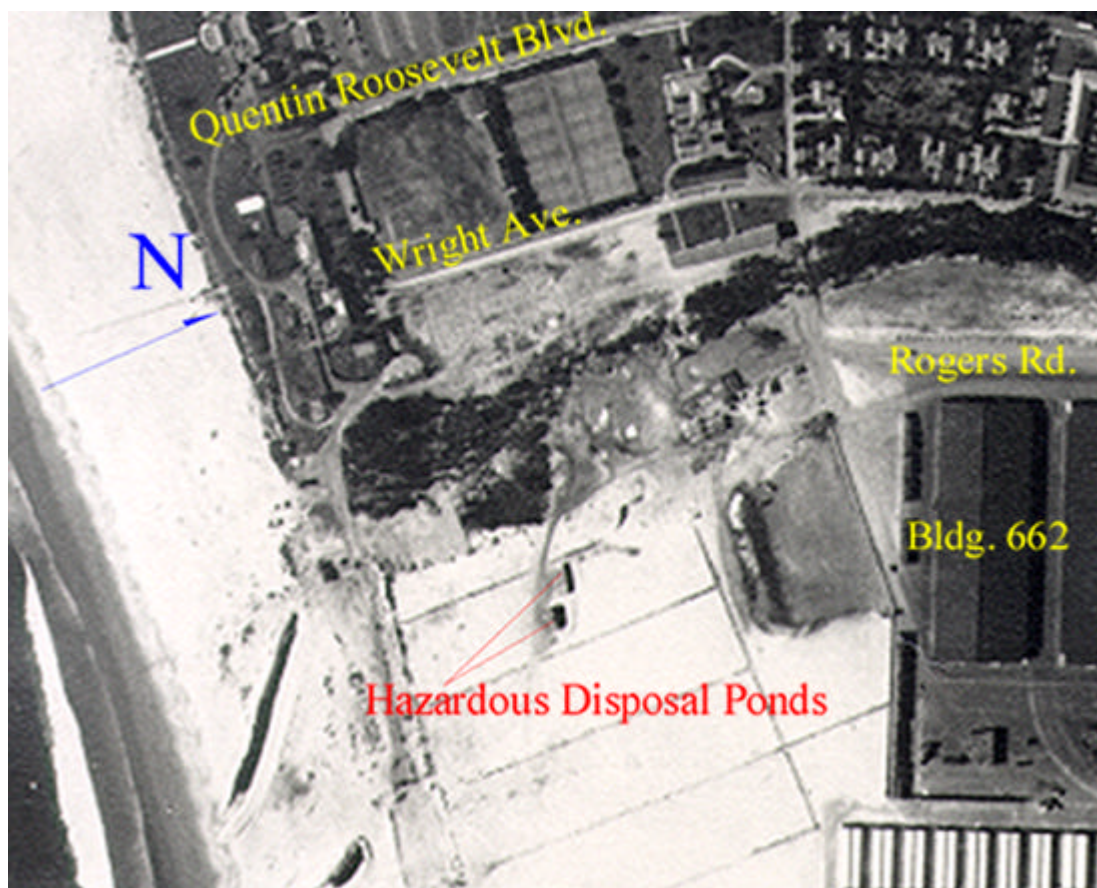


Photo 1: Location of the former hazardous waste disposal ponds at Installation Restoration Site 5 – Unit 2 as shown in this aerial photograph dated 1948.



Photo 2: Site conditions as of July 1999 at Installation Restoration Site 5 – Unit 2; view is to southeast. Golf cart path and monitoring well S5-MW-21 are seen in foreground.



Photo 3: Site conditions as of July 1999 at Installation Restoration Site 5 – Unit 2; view is to the southwest. Runway approach lights seen in the middle of the picture.

ATTACHMENT B

ADMINISTRATIVE RECORD INDEX

Naval Air Station North Island
Site 5 Time Critical Removal Action
Administrative Record Index

UIC NO	REC #	AUTHOR AFFILIATION		
RECORD DATE		AUTHOR		
RECORD TYPE		RECIPIENT AFFILIATION		
APPROX. # PAGES		RECIPIENT	SUBJECT	SITE
N00246	002373	BECHTEL NATIONAL INC	FINAL COMMUNITY RELATIONS PLAN (ELECTRONIC MEDIA COPY [CD] INCLUDED)	00005
04-30-1999		K. PARKER		
PLAN		SOUTHWEST DIVISION		
0260		R. SELBY		
N00246	002285	BECHTEL NATIONAL INC	DRAFT COMMUNITY RELATIONS PLAN	00005
10-21-1998		J. BAILEY		
PLAN		VARIOUS AGENCIES		
0210				
N00246	002277	SOUTHWEST DIVISION	SEMI-ANNUAL LANDFILL REPORTS FOR SITE 2, OLD SPANISH BIGHT LANDFILL & SITE 5, GOLF COURSE GARBAGE DISPOSAL AREA	00005
09-04-1998		W. COLLINS		
XMTL		VARIOUS AGENCIES		
0475				

UIC NO	REC #	AUTHOR AFFILIATION		
RECORD DATE		AUTHOR		
RECORD TYPE		RECIPIENT AFFILIATION		
APPROX. # PAGES		RECIPIENT	SUBJECT	SITE
N00246	002356		FINAL WELL MANAGEMENT PLAN DTD 8/98	00005
08-26-1998				
RPT				
1000				
N00246	002335	BECHTEL NATIONAL INC	FINAL WELL MANAGEMENT PLAN	00005
08-24-1998		S. DONOVAN		
PLAN		SOUTHWEST DIVISION		
1000				
N00246	002204	SOUTHWEST DIVISION	RESPONSE TO LETTER DATED JUNE 11, 1998, REGARDING THE FIELD FAMPLING EFFORTS AT BUILDINGS 379 AND 397 (DATED JUNE 22, 1998)	00005
07-01-1998		R. MACH JR.		
LTR		CRWQCB SAN DIEGO		
0008		C. CHENG		
N00246	002268	BECHTEL NATIONAL INC	FACT SHEET DATED MAY 1998	00005
06-23-1998		J. BAILEY		
XMTL		SOUTHWEST DIVISION		
0011		W. COLLINS		

UIC NO	REC #	AUTHOR AFFILIATION		
RECORD DATE		AUTHOR		
RECORD TYPE		RECIPIENT AFFILIATION		
APPROX. # PAGES		RECIPIENT	SUBJECT	SITE
N00246	002349	CRWQCB	CRWQCB CONCURRENCE WITH AND COMMENTS ON DRAFT LANDFILL MAINTENANCE PLAN FOR SITE 5, GOLF COURSE GARBAGE DISPOSAL AREA	00005
06-18-1998		M. ALPERT		
MISC		SOUTHWEST DIVISION		
0004		W. COLLINS		
N00246	002203	SOUTHWEST DIVISION	LETTER SUBMITTING THE "RESPONSE TO COMMENTS ON THE DRAFT FINAL RI/RCRA FACILITY INVESTIGATION REPORT FOR SITE 5 W/ REPLACEMENT PGS. DATED APRIL 1998	00005
06-15-1998		W. COLLINS		
LTR		DTSC CYPRESS		
0031		A. GIMENO		
N00246	002200	PWC SAN DIEGO	DRAFT POST-CLOSURE MAINTENANCE PLAN FOR INACTIVE LANDFILL SITE 5-GOLF COURSE GARGAGE DISPOSAL AREA W/LTR FOR ENCLOSURE	00005
05-19-1998		S. SANFORD		
PLAN		SOUTHWEST DIVISION		
0150				

UIC NO	REC #	AUTHOR AFFILIATION		
RECORD DATE		AUTHOR		
RECORD TYPE		RECIPIENT AFFILIATION		
APPROX. # PAGES		RECIPIENT	SUBJECT	SITE
N00246	002263	SOUTHWEST DIVISION	DRAFT POST-CLOSURE MAINTENANCE PLAN FOR INACTIVE LANDFILL, SITE 5, GOLF COURSE GARBAGE DISPOSAL AREA	00005
05-19-1998		W. COLLINS		
XMTL		VARIOUS AGENCIES		
0180				
N00246	002196	BECHTEL NATIONAL INC	FINAL REMEDIAL INVESTIGATION/RCRA FACILITY INVESTIGATION REPORT SITE 5-GOLF COURSE GARBAGE DISPOSAL AREA (REPLACEMENT PAGES) DATED APRIL 1998	00005
05-18-1998		J. BAILEY		
XMTL		NAS NORTH ISLAND		
0027		M. MAGEE		
N00246	002175	DON SAN DIEGO	LANDFILL MAINTENANCE PLAN SCHEDULE FOR REVIEW AND COMMENT	00005
04-15-1998		W. COLLINS		
LTR		CRWQCB SAN DIEGO		
0007		M. ALPERT		
N00246	002260	CRWQCB SAN DIEGO	MONITORING AND REPORTING REQUIREMENTS PURSUANT OF REGIONAL BOARD ORDER NO. 97-11 FOR GOLF COURSE & SERE CAMP LANDFILLS, DUE NOTICE FOR 10/30/97 REPORT	00005
03-17-1998		M. ALPERT		
LTR		PWC SAN DIEGO		
0001				

UIC NO	REC #	AUTHOR AFFILIATION		
RECORD DATE		AUTHOR		
RECORD TYPE		RECIPIENT AFFILIATION		
APPROX. # PAGES		RECIPIENT	SUBJECT	SITE
N00246	002164	PWC SAN DIEGO	RESPONSE TO VARIOUS ITEMS: FOURTH QUARTER SUMMARY REPORT OF COMPLETED & PROJECTED ACTIVITIES FOR THE SWMUS NASNI	00005
01-30-1998		P. CRECELIUS		
LTR		DTSC LONG BEACH		
0004		K. KOU		
N00246	002070	NASNI SAN DIEGO	NAB CORONADO LIST OF CERCLA IR SITES AND SITE MAP	00005
12-22-1997		A.V. BERNARDO		
LTR		VARIOUS AGENCIES		
0003				
N00246	002071	NASNI SAN DIEGO	NAS NORTH ISLAND IR SITE MAP	00005
12-22-1997		A.V. BERNARDO		
LTR		VARIOUS AGENCIES		
0005				
N00246	002118	DTSC LONG BEACH	COMMENTS TO DRAFT FINAL REMEDIAL INVESTIGATION/RCRA FACILITY INVESTIGATION REPORT, SITE 5	00005
12-05-1997		A. GIMENO		
LTR		VARIOUS AGENCIES		
0010				

UIC NO	REC #	AUTHOR AFFILIATION		
RECORD DATE		AUTHOR		
RECORD TYPE		RECIPIENT AFFILIATION		
APPROX. # PAGES		RECIPIENT	SUBJECT	SITE
N00246	002296	PESI	PRELIMINARY EVALUATION OF MONITORED NATURAL ATTENUATION FOR GROUNDWATER AT SITE 5	00005
12-01-1997				
RPT		SOUTHWEST DIVISION		
0130				
N00246	002077	PWC SAN DIEGO	RESPONSE TO THE THIRD QUARTER SUMMARY REPORT OF COMPLETED AND PROJECTED ACTIVITIES FOR THE SWMUS	00005
11-04-1997		A. HARRINGTON		
LTR		VARIOUS AGENCIES		
0003				
N00246	002085	NASNI SAN DIEGO	OCTOBER 30, 1997, RAB MEETING AGENDA, MEETING MINUTES FACT SHEET AND MISC. OVERHEAD DATA	00005
10-30-1997				
MM		RAB MEMBERS		
0045				
N00246	002114	DTSC LONG BEACH	SITE 5 GOLF COURSE DISPOSAL AREA	00005
10-23-1997		A. GIMENO		
LTR		NAV. STATION S.DIEGO		
0004		D. DEMARS		

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N00246	002323	SOUTHWEST DIVISION	RAB HANDOUTS FOR OCTOBER 23, 1997 MEETING	00005
10-23-1997				
MISC		RAB MEMBERS		
0021				
N00246	002250	CRWQCB SACRAMENTO	FY 1997-98 INVOICE FOR WASTE DISCHARGE REQUIREMENT FEES	00005
09-29-1997		W. PETTIT		
LTR		SOUTHWEST DIVISION		
0005		W. COLLINS		
N00246	002115	NASNI SAN DIEGO	RESPONSE TO TELEPHONE REQUEST OF SEPTEMBER 24, 1997, IR SITE IS A CERCLA SITE AND PROJECT; NASNI BE EXEMPTED UNDER 42 USC 9621 SCE.121(E)&40 CFR 300.400(E)	00005
09-26-1997		A.V. BERNARDO		
LTR		DEH SAN DIEGO		
0001		M. SUE		
N00246	002079	LEE & ASSOCIATES	SEPTEMBER 25, 1997, RAB MEETING MINUTES	00005
09-25-1997				
MM		RAB MEMBERS		
0018				

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N00246	002248	NASNI SAN DIEGO	REQUEST FOR PROPOSALS - DESIGN/BUILD CONTRACT FOR REPAIR GOLF COURSE IRRIGATION SYSTEM & SCHEMATIC DESIGN DRAWINGS FOR REPAIR GOLF COURSE IRRIGATION SYS	00005
09-11-1997		A. BERNARDO		
MISC		VARIOUS AGENCIES		
0200				
N00246	002034	NASNI SAN DIEGO	FORWARDING FOR INFORMATION; LIMITED SOIL ASSESSMENT REPORT, GOLF COURSE CLUB HOUSE AND GENERAL SITE 5,	00005
06-30-1997		A.V. BERNARDO		
LTR		VARIOUS AGENCIES		
0015				
N00246	002037	NASNI RAB	JUNE 26, 1997, RAB MEETING MINUTES	00005
06-26-1997				
MISC		MEMBERS		
0001				

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N00246	001931	SOUTHWEST DIVISION	REGARDING LETTER OF APRIL 10, 1997, TRANSMITTAL OF THREE SEPARATE LISTS FOR FORMER LANDFILLS TO BE MONITORED IN REDUCING THE NUMBER OF ANALYTES EACH YR.	00005
06-06-1997		W. COLLINS		
LTR		VARIOUS AGENCIES		
0007				
N00246	002041	PARSONS ENGINEERS	DRAFT FINAL WORK PLAN FOR ASSESSING REMEDIATION BY NATURAL ATTENUATION FOR GROUNDWATER CONTAMINATION AT SITE 5 (UNIT 2) GOLF COURSE DISPOSAL AREA	00005
06-01-1997				
PLAN		NAS NORTH ISLAND		
0450				
N00246	002019	NASNI SAN DIEGO	JUNE 18, 1997 QUARTERLY TEAM MEETING AGENDA AND LOCATION MAP; MARCH 19, 1997 QUARTERLY TEAM MEETING MINUTES	00005
05-29-1997		A.V. BERNARDO		
LTR		VARIOUS AGENCIES		
0016				

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N00246	002017	PWC SAN DIEGO	RESPONSE TO VARIOUS ITEMS ADDRESSING THE FIRST QUARTERSUMMARY REPORT AT NASNI	00005
05-23-1997		A. COZAKOS		
LTR		DTSC LONG BEACH		
0003		J. KOU		
N00246	001844	BECHTEL NATIONAL INC	LETTER AND CONTENTS OF THE DRAFT FINAL REMEDIAL INVESTIGATION (RI) RCRA FACILITY INVESTIGATION (RI) REPORT FOR SITE 5 & ATTACHED SHEET TO REGULATORS	00005
12-10-1996		J.F. BAILEY		
XMTL		SOUTHWEST DIVISION		
0005		R. SELBY		
N00246	001868	NAVSTA SAN DIEGO	ENCLOSURE LETTER FOR REVIEW AND COMMENT OF DRAFT RI/RFI REPORT FOR SITE 5 W/O ENCLOSURE (REF. DOC. #001774)	00005
11-25-1996		W. COLLINS		
LTR		DTSC LONG BEACH		
0004		A. GIMENO		
N00246	001848	BECHTEL NATIONAL INC	DRAFT FINAL REMEDIAL INVESTIGATION/RCRA FACILITY INVESTIGATION REPORT SITE 5	00005
11-01-1996		J. KOZAKOWSKI		
RPT		SOUTHWEST DIVISION		
2000				

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N00246	002066	PWC SAN DIEGO	FOR REVIEW THE THIRD QUARTER SUMMARY REPORT OF COMPLETED AND PROJECTED ACTIVITIES FOR THE SWMUS: RESPONSE TO VARIOUS ITEMS	00005
10-31-1996		A. COZAKOS		
LTR		DTSC LONG BEACH		
0003		J. KOU		
N00246	001774	BECHTEL NATIONAL INC	DRAFT REMEDIAL INVESTIGATION/RCRA FACILITY INVESTIGATION REPORT SITE 5-GOLF COURSE GARBAGE DISPOSAL AREA	00005
10-03-1996		J. BAILEY		
XMTL		SOUTHWEST DIVISION		
2000		R. SELBY		
N00246	001781	SOUTHWEST DIVISION	RCRA CORRECTIVE ACTION SCHEDULE FOR NASNI EPA ID NO.CA7170090016 FOR SWMU'S 1 THROUGH 7,9,10 & 12 FORMERLY IR SITES 1 THROUGH 7,9,10 & 12	00005
09-30-1996		D. NELSON		
LTR		DTSC LONG BEACH		
0004		J. SCANDURA		
N00246	001660	DTSC SACRAMENTO	LETTER AND DRAFT ON HAZARDOUS WASTE FACILITY PERMIT FOR NAS NORTH ISLAND	00005
05-21-1996		D. REGEINS		
LTR		NAS NORTH ISLAND		
0157				

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N00246	001566	PWC SAN DIEGO	FIRST QUARTER SUMMARY REPORT (1996) FOR SWMUS AT SAN DIEGO SITES 11, 9, 5, 4, 6, 10, 2,3,7,12,1	00005
05-06-1996		M. WURBS		
LTR		DTSC LONG BEACH		
0004		M. SANDHU		
N00246	001520	CORONADO EAGLE	NEWSPAPER ARTICLE "OPEN LETTER TO THE MAYOR"	00005
03-06-1996				
MISC		COMMUNITY MEMBERS		
0001				
N00246	001521	CORONADO EAGLE	NEWSPAPER ARTICLE "NAVY OFFERS ANSWERS TO CORONADO EAGLE QUESTIONS"	00005
03-06-1996				
MISC		COMMUNITY MEMBERS		
0001				
N00246	001554	BECHTEL NATIONAL INC	MANAGEMENT ACTION PLAN (SIGNED 3/11/96)	00005
03-01-1996		S. DEYOUNG		
PLAN		SOUTHWEST DIVISION		
0250				

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N00246	001557	BECHTEL NATIONAL INC	PRELIMINARY FINAL ESI/RFI/RSE REPORT SITES 2,3,4,7, & 12 (SIGNED 3/28/96)	00005
03-01-1996		J.M. KOZAKOWSKI		
RPT		SOUTHWEST DIVISION		
1000				
N00246	001524	CORONADO EAGLE	NEWSPAPER ARTICLE "NAVY PUT THE MOES ON THIRD STREET"	00005
01-31-1996				
MISC		COMMUNITY MEMBERS		
0001				
N00246	001503	PWC SAN DIEGO	RCRA FOURTH QUARTER SUMMARY REPORT	00005
01-24-1996		M. WURBS		
LTR		DTSC LONG BEACH		
0004				
N00246	001523	CORONADO EAGLE	NEWSPAPER ARTICLE "CONCERNS VOICED IN MEETING WITH BRIAN BILBRAY"	00005
01-17-1996				
MISC		COMMUNITY MEMBERS		
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N00246	001510	CORONADO EAGLE	NEWSPAPER ARTICLE "NASNI RAB TO ELECT NEW COMMUNITY CO-CHAIR DURING JAN. 17 MEETING"	00005
01-10-1996				
MISC		COMMUNITY MEMBERS		
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N00246	001511	CORONADO EAGLE	NEWSPAPER ARTICLE "CORONADO NEIGHBORS COME TOGETHER TODISCUSS TRAFFIC PROBLEM" REROUTING TRUCKS THROUGH CORONADO TO ENTER NASNI AT A DIFFERENT GATE	00005
01-10-1996				
MISC		COMMUNITY MEMBERS		
0001				
N00246	001522	CORONADO EAGLE	NEWSPAPER ARTICLE "THE NAVY HAS BEEN A GOOD CORONADO NEIGHBOR, AND WILL CONTINUE AS SUCH"	00005
01-03-1996				
MISC		COMMUNITY MEMBERS		
0001				

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N00246	001450	CRWQCB SAN DIEGO	COMMENTS ON THE DRAFT TECHNICAL MEMORANDUM WORK PLAN SUPPLEMENT FOR SITE 5 GOLF COURSE DISPOSAL AREA	00005
01-02-1996		J.P. ANDERSON		
LTR		NAS NORTH ISLAND		
0003		A. BERNARDO		
N00246	001448	SOUTHWEST DIVISION	RESPONSE TO COMMENTS ON THE WORK PLAN SUPPLEMENT FOR SITE 5 GOLF COURSE DISPOSAL AREA	00005
12-20-1995		D. CASEY		
LTR		CITY OF CORONADO		
0002		H. BLUDAU		
N00246	001449	DTSC LONG BEACH	COMMENTS ON WORK PLAN SUPPLEMENT SITE 5 GOLF COURSE DISPOSAL AREA	00005
12-19-1995		G. HOLMES		
LTR		NAS NORTH ISLAND		
0017		CO		
N00246	001445	CITY OF CORONADO	COMMENTS ON SITE 5 WORK PLAN SUPPLEMENT GOLF COURSE DISPOSAL AREA	00005
12-08-1995		H. BLUDAU		
LTR		SOUTHWEST DIVISION		
0001		D. CASEY		

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N00246	001439	DTSC LONG BEACH	PRIORITIZATION OF DOCUMENT REVIEW FOR SITE 2,5, & 9 REPORTS	00005
11-13-1995		S. LOWE		
LTR		NAS NORTH ISLAND		
0003		CO		
N00246	001395	SOUTHWEST DIVISION	DRAFT TECHNICAL MEMORANDUM WORK PLAN SUPPLEMENT SITE 5 GOLF COURSE DISPOSAL AREA SENT FOR REVIEW AND COMMENT (SEE DOC. NO. N00246.001395 FOR WORK PLAN)	00005
11-06-1995		D.A. CASEY		
PLAN		DTSC LONG BEACH		
0004		G. HOLMES		
N00246	001394	BECHTEL NATIONAL INC	DRAFT TECHNICAL MEMORANDUM WORK PLAN SUPPLEMENT SITE 5 GOLF COURSE DISPOSAL AREA	00005
10-18-1995		J. KOZAKOWSKI		
PLAN		SOUTHWEST DIVISION		
0025				
N00246	001342	BECHTEL NATIONAL INC	SEPTEMBER 14, 1995 RAB MEETING FINAL MEETING TRANSCRIPT	00005
10-11-1995				
MM		SOUTHWEST DIVISION		
0020		P. KENNDY		

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N00246	001326	SOUTHWEST DIVISION	SEPTEMBER 14, 1995 RAB MEETING AGENDA AND RAB MEETING MINUTES	00005
09-14-1995				
MISC		COMMUNITY MEMBERS		
0020				
N00246	001246		RAB DOCUMENT REVIEW STATUS	00005
07-19-1995				
MISC				
0002				
N00246	002245	PWC SAN DIEGO	RCRA RFI QUARTERLY SUMMARY OF COMPLETED AND PROJECTED ACTIVITIES FOR THE SWMUS	00005
07-14-1995		M. WURBS		
RPT		DTSC LONG BEACH		
0004		M. SANDHU		
N00246	002107	DTSC LONG BEACH	PRELIMINARY DRAFT OF RCRA CORRECTIVE ACTION MODULE FOR NASNI	00005
07-11-1995		J. ZARNOCH		
MISC		VARIOUS AGENCIES		
0053				

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N00246	001221	APCD	PROPOSED IRRIGATION LINE INSTALLATION PROJECT SITE 5	00005
06-26-1995		D. BYRNES		
LTR		SOUTHWEST DIVISION		
0002		D. CASEY		
N00246	001223	SOUTHWEST DIVISION	NOTIFICATION OF A PROJECT TO INSTALL A WATER LINE ADJACENT TO IR SITE 5	00005
06-19-1995		D. CASEY		
LTR		APCD SAN DIEGO		
0003		D. BURNS		
N00246	001205	BECHTEL NATIONAL INC	FINAL COMMUNITY RELATIONS PLAN	00005
06-16-1995		B. SCHMUCKER		
PLAN		SOUTHWEST DIVISION		
0250				
N00246	001041	SOUTHWEST DIVISION	TECHNICAL MEMORANDUM SITE 5 GOLF COURSE GARBAGE DISPOSAL AREA SENT FOR REVIEW AND COMMENT	00005
04-25-1995		D.A CASEY		
LTR		DTSC SACRAMENTO		
0001		J. POLISINI		

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N00246	001170	DTSC LONG BEACH	COMMENTS ON THE FINAL SITE 5 SITE CHARACTERIZATION SUMMARY, TECHNICAL MEMORANDUM	00005
04-21-1995		J.J. ZARNOCH		
LTR		NAS NORTH ISLAND		
0005				
N00246	001106	U.S. FISH & WILDLIFE	COMMENTS ON THE FINAL TECHNICAL MEMORANDA SITE 5 & 6	00005
04-06-1995		G.C. KOBETICH		
LTR		SOUTHWEST DIVISION		
0002		D.A CASEY		
N00246	001063	BECHTEL NATIONAL INC	FINAL BIOASSAY AND ENVIRONMENTAL SAMPLING AND ANALYSIS WORK PLAN SHORELINE SEDIMENTS (W/LTR FOR COMMENTS)	00005
04-01-1995		N. KAWAMOTO		
RPT		SOUTHWEST DIVISION		
0350				
N00246	001254		MARCH 30, 1995 RAB MEETING MINUTES AND APRIL 13, 1995 MEETING AGENDA	00005
03-30-1995				
MM				
0033				

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N00246	001052	CORONADO EAGLE	NEWS ARTICLE "LEGAL NOTICE REQUEST OF PUBLIC REVIEW AND COMMENT ON THE IRP TECHNICAL MEMORANDA AND WORK PLAN	00005
03-29-1995				
MISC				
0001				
N00246	001073	SOUTHWEST DIVISION	REQUEST DTSC IDENTIFY POTENTIAL STATE CHEMICAL SPECIFIC AND LOCATION SPECIFIC ARARS FOR SITE 5	00005
03-22-1995		D.A. CASEY		
LTR		DTSC LONG BEACH		
0004		ZARNOCH		
N00246	001082	SOUTHWEST DIVISION	FINAL SAN DIEGO SITE 5 GOLF COURSE GARBAGE DISPOSAL AREA FOR REVIEW AND COMMENT	00005
03-10-1995		D.A CASEY		
LTR		NAS NORTH ISLAND		
0001				
N00246	001556	BECHTEL NATIONAL INC	DRAFT COMMUNITY RELATIONS PLAN (SIGNED 3/21/95)	00005
03-01-1995		R. COLEMAN		
PLAN		SOUTHWEST DIVISION		
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N00246	001028	SOUTHWEST DIVISION	FINAL SITE 6 AND SITE 5 TECHNICAL MEMORANDUM SENT FOR REVIEW AND COMMENT (SEE DOC. # 001026 & 001027)	00005
02-16-1995		D.A. CASEY		
LTR		DTSC LONG BEACH		
0004		J. ZARNOCH		
N00246	001026	BECHTEL NATIONAL INC	FINAL SITE 5 GOLF COURSE GARBAGE DISPOSAL AREA SITE CHARACTERIZATION SUMMARY TECHNICAL MEMORANDUM	00005
02-01-1995		J. KOZAKOWSKI		
RPT		SOUTHWEST DIVISION		
1000				
N00246	000911	FISH & WILDLIFE	COMMENTS ON THE DRAFT BIOASSAY AND ENVIRONMENTAL SAMPLING AND ANALYSIS WORK PLAN FOR SHORELINE SEDIMENTS AT NASNI SAN DIEGO	00005
12-15-1994		G.C. KOBETICH		
LTR		SOUTHWEST DIVISION		
0002		W.E. COLLINS		
N00246	000891	EHC SAN DIEGO	ENVIRONMENTAL HEALTH COALITION (EHC) COMMENTS ON THE DRAFT BIOASSAY AND ENVIRONMENTAL SAMPLING AND ANALYSISWORKPLAN (BESAP)	00005
12-13-1994		L. HUNTER		
LTR		SOUTHWEST DIVISION		
0009		B. COLLINS		

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N00246	000865	SOUTHWEST DIVISION	SENT FOR REVIEW AND COMMENTS ON THE DRAFT BIOASSAY AND ENVIRONMENTAL SAMPLING & ANALYSIS WORK PLAN SHORELINE SEDIMENTS	00005
11-23-1994		W.E. COLLINS		
RPT		EPA SAN FRANCISCO		
0250		A. OTA		
N00246	002236	SOUTHWEST DIVISION	DRAFT BIOASSAY AND ENVIRONMENTAL SAMPLING AND ANALYSIS WORK PLAN (BESAP) - SHORELINE SEDIMENTS - FOR REVIEW AND COMMENTS (TITLE PAGE & PGS 3-2 & 7-2 ONLY)	00005
10-11-1994		W. COLLINS		
PLAN		VARIOUS AGENCIES		
0008				
N00246	002235	DON	NAVY ENVIRONMENTAL LEADERSHIP PROGRAM (NELP) GUIDE - NASNI	00005
10-01-1994				
GUID				
0080				
N00246	001176	BECHTEL NATIONAL INC	DRAFT BIOASSAY AND ENVIRONMENTAL SAMPLING AND ANALYSIS WORK PLAN SHORELINE SEDIMENTS	00005
09-29-1994		N. KAWAMOTO		
PLAN		SOUTHWEST DIVISION		
0250				

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N00246	002065	PWC SAN DIEGO	RESPONSE TO RCRA FACILITY INVESTIGATION (RFI) THIRD QUARTER SUMMARY REPORT	00005
09-26-1994		W. WURBS		
LTR		DTSC LONG BEACH		
0004		M. SANDHU		
N00246	002233	BECHTEL NATIONAL INC	QUALITY ASSURANCE PROJECT PLAN AMENDMENT	00005
08-30-1994		E. HOULE		
PLAN		SOUTHWEST DIVISION		
0013		W. COLLINS		
N00246	001855	DON SAN DIEGO	RESPONSE TO REVIEW OF THE SECOND QUARTER SUMMARY REPORT OF COMPLETED ACTIVITIES FOR SWMUS	00005
07-31-1994		A. COZAKOS		
LTR		DTSC LONG BEACH		
0075		M. SANDHU		
N00246	000378	NASNI SAN DIEGO	FACT SHEET NO. 3 RAB, IR, SITES 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	00005
06-01-1994		K. MITCHELL		
MISC		PUBLIC RELEASE		
0004				

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N00246	001656	METCALF & EDDY INC	PART B PERMIT APPLICATION FOR THE RENEWAL OF A HAZARDOUS WASTE FACILITY PERMIT VOLUME I, II, & III TREATMENT, STORAGE, & DISPOSAL FACILITY	00005	
05-21-1994		SAN DIEGO			
MAP		NAVY SAN DIEGO			
0500					
N00246	000354	SOUTHWEST DIVISION	MINUTES FROM 27 JANUARY 1994 COMBINED REGULATORY MEETING COVERING CTO- 10 KICK OFF CTO-09 SITE INTRODUCTION AND PCB REMOVAL ACTION	00005	
02-22-1994		SUSAN STUFFLE			
MM		DTSC			
0006		CRAIG O'ROURKE			
N00246	000352	SOUTHWEST DIVISION	MEETING MINUTES FROM 2 FEBRUARY 1994 REGULATRY KICK OFF MEETING REGARDING BIOASSAY WORK PLAN DEVELOPMENT	00005	
02-15-1994		SUSAN STUFFLE			
MM		DTSC			
0014		CRAIG O'ROURKE			
N00246	000342	SOUTHWEST DIVISION	REGULATORY KICKOFF MEETING FOR CTO 13 BIOASSY WORK PLAN DEVELOPMENT	00005	
01-19-1994		SUSAN STUFFLE			
LTR		DTSC			
0003		CRAIG O'ROURKE			

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N00246	000936	BECHTEL NATIONAL INC	FINAL COMMUNITY RELATIONS PLAN ADDENDUM FOR SAN DIEGO	00005
01-05-1994		R. COLEMAN		
PLAN		SOUTHWEST DIVISION		
0076		R. MACH		
N00246	002216	PWC SAN DIEGO	RFI QUARTERLY SUMMARY OF COMPLETED AND PROJECTED ACTIVITIES FOR THE SWMUS	00005
05-27-1992		M. CLAUSSEN		
RPT		DTSC LONG BEACH		
0002		M. SANDHU		
N00246	001987	DTSC LONG BEACH	REVIEW & APPROVAL OF THE RCRA FACILITY INVESTIGATION (RFI)WORKPLAN W/MODIFICATIONS; ALL FIELD WORK & SUBMITDRAFT RFI REPORT BY FEBRUARY 15, 1994 (REFER DOC#2008)	00005
03-16-1992		M. SANDHU		
LTR		NAS NORTH ISLAND		
0007		N.W. CLEMENTS		
N00246	002215	PWC SAN DIEGO	RFI QUARTERLY SUMMARY OF COMPLETED AND PROJECTED ACTIVITIES FOR THE SWMUS	00005
03-02-1992		M. CLAUSSEN		
RPT		DTSC LONG BEACH		
0002		M. SANDHU		

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N00246	000365		FACT SHEET NO. 1	00005
02-01-1992				
MISC				
0004				
N00246	002000	NOAA SEATTLE WA	COMMENTS ON REMEDIAL INVESTIGATION/FEASIBILITY STUDY, SITES 1,5,6,9, AND 10 WORK PLAN & APPENDICES AND SAMPLING AND ANALYSIS PLAN & APPENDICES	00005
11-26-1991		M. BUCHMAN		
LTR		NAS NORTH ISLAND		
0005		N.W. CLEMENTS		
N00246	001998	NASNI SAN DIEGO	SUBMITTAL FOR A COPY OF THE FINAL DRAFTS OF THE QAPP, HSP, AND SAP FOR SITES 1,5,6,9, AND 10 W/O ENCLOSURES	00005
11-25-1991		N.W. CLEMENTS		
LTR		VARIOUS AGENCIES		
0006				
N00246	001997	CRWQCB SAN DIEGO	COMMENTS ON THE FINAL DRAFTS QUALITY ASSURANCE PROJECTPLAN (QAPP), HEALTH AND SAFETY PLAN (HSP), & SAMPLING AND ANALYSIS PLAN (SAP)WORK PLANS FOR SITES 1,5,6,9,10	00005
11-15-1991		A. COE		
LTR		VARIOUS AGENCIES		
0006				

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N00246	001996	CRWQCB SAN DIEGO	COMMENTS ON THE FINAL REMEDIAL INVESTIGATION FEASIBILITY STUDY (RI/FS) WORK PLAN FOR SITES 1,5,6, 9 AND 10	00005
11-14-1991		A. COE		
LTR		NAS NORTH ISLAND		
0003		N.W. CLEMENTS		
N00246	002056	NASNI SAN DIEGO	SUBMITTAL OF FINAL DRAFT OF THE QAPP, THE H&S PLAN, AND THE SAMPLING AND ANALYSIS PLAN FOR SITES 1,5,6, 9, AND 10 AND RELATED APPENDICES W/O ENCLOSURES	00005
10-16-1991		N.W. CLEMENTS		
LTR		VARIOUS AGENCIES		
0006				
N00246	000172	JACOBS ENGINEERING	SITES 1,5,6,9 AND 11 SAP DRAFT	00005
10-14-1991		D. ROWLISON		
LTR		SOUTHWEST DIVISION		
0150				
N00246	002057	NASNI SAN DIEGO	SUBMITTAL COPY OF THE FINAL REMEDIAL INVESTIGATION FEASIBILITY STUDY WORK PLAN FOR SITES 1,5,6,9, AND 10 AND RELATED APPENDICES W/O ENCLOSURES	00005
10-07-1991		N.W. CLEMENTS		
LTR		FISH & WILDLIFE SERV		
0001		D. AUDET		

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N00246	000173	JACOBS ENGINEERING	SITES 1,5,6,9 AND 11 H&SP DRAFT	00005
10-04-1991		D. ROWLISON		
LTR		SOUTHWEST DIVISION		
0075				
N00246	001182	JACOBS ENGINEERING	DRAFT HEALTH AND SAFETY PLAN SITES 1,5,6,9, & 10	00005
10-04-1991		S. JOHNSON		
PLAN		SOUTHWEST DIVISION		
0125				
N00246	002058	NASNI SAN DIEGO	IN ACCORDANCE W/ REQUIREMENTS OF 12/21/89 CALIF. FINALHAZ-WASTE FACILITY PERMIT; SUBMITTAL OF THE RI/FS WKPNFOR SITES 1,5,6,9, 10 AND RELATED APPENDICES W/O ENCL.	00005
10-02-1991		N.W. CLEMENTS		
LTR		VARIOUS AGENCIES		
0003				
N00246	002060	NASNI SAN DIEGO	NOTIFICATION OF TRC MEETING TO BE SCHEDULED FOR OCTOBER 30, 1991 ALONG WITH ENCLOSED JUNE 26, 1991 MEETING MINUTES.	00005
09-20-1991		N.W. CLEMENTS		
LTR		VARIOUS AGENCIES		
0020				

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N00246	000174	JACOBS ENGINEERING	SITES 1,5,6,9 RI/FS WORK PLAN	00005
09-01-1991		D. ROWLISON		
LTR		SOUTHWEST DIVISION		
0075				
N00246	000015	JACOBS ENGINEERING	RI/FS WORK PLAN APPENDICES	00005
09-01-1991				
RPT		SOUTHWEST DIVISION		
0450				
N00246	000048	JACOBS ENGINEERING	SI REPORT GOLF COURSE GARBAGE DISPOSAL AREA SITE 5	00005
06-13-1991				
RPT		SOUTHWEST DIVISION		
0049				
N00246	001975	NASNI SAN DIEGO	NOTIFICATION OF NEXT TRC MEETING TO BE SCHEDULED FOR WEDNESDAY, JUNE 26, 1991 AT 9:00 AM. TO BE HELD AT THE CRWQCB 9771 CLAIREMONT MESA BLVD.	00005
06-06-1991		N.W. CLEMENTS		
LTR		SOUTHWEST DIVISION		
0001		CO		

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N00246	000167	COUNTY OF SAN DIEGO	SAP QA PROJECT PLAN H&SP SITES 1, 5, 6, 9, 10 AND 11 DRAFT	00005
04-16-1991		J.A. MENATTI		
LTR		NAS NORTH ISLAND		
0002		N.W. CLEMENTS		
N00246	000166	COUNTY OF SAN DIEGO	RI FS STUDY WORK PLAN SITES 1,5,6,9,10 AND 11 DRAFT	00005
04-16-1991		J.A. MENATTI		
LTR		NAS NORTH ISLAND		
0004		N.W. CLEMENTS		
N00246	001979	NASNI SAN DIEGO	TRANSMITTAL OF VARIOUS DOCUMENTS OUTLINING SOME OF THEWORKING PLANS FOR THE IRP AT NASNI FOR REVIEWING W/O ENCLOSURES	00005
04-15-1991		N.W. CLEMENTS		
LTR		EPA SAN FRANCISCO		
0001		C. DEMAREST		
N00246	000170	CRWQCB SAN DIEGO	SAP H&SP FOR SITE 1,5,6,9,10 AND 11 QAPP	00005
04-02-1991		A.L. COE		
LTR		NAS NORTH ISLAND		
0005		N.W. CLEMENTS		

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N00246	000171	CRWQCB SAN DIEGO	COMMENTS ON RI/FS WORK PLAN SITES 1,5,6,9, 10 AND 11	00005
04-01-1991		A.L. COE		
LTR		NAS NORTH ISLAND		
0007		N.W. CLEMENTS		
N00246	001976	NASNI SAN DIEGO	FEBRUARY 20, 1991, DRAFT OF TRC MEETING MINUTES FOR REVIEW AND COMMENT; ALL CHANGES OR CORRECTIONS TO BE FORWARDED BY APRIL 5, 1991 FOR MTG. OF APRIL 24, 1991	00005
03-29-1991		N.W. CLEMENTS		
LTR		VARIOUS AGENCIES		
0026				
N00246	001986	CITY OF CORONADO	CONSIDERATIONS FOR THE SITE 5, SITE INSPECTION REPORT-CTO#0043, PLATE 4 (MAP OF SITE AND GROUNDWATER MONITORING POINTS).	00005
01-08-1991		G.L. ANDERSON		
LTR		SOUTHWEST DIVISION		
0002		A. DAHLIN		

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N00246	001989	DTSC LONG BEACH	NOTIFICATION ON RECEIPT OF DRAFT SITE INSPECTION (SI) REPORTS FOR SITES 1,5,6,9,10, AND 11, A MGT PLAN AND CRP; WILL FORWARD WRITTEN COMMENT AT A LATER DATE	00005
12-24-1990		J. BODERICK		
LTR		NAS NORTH ISLAND		
0001		N.W. CLEMENTS		
N00246	001990	NASNI SAN DIEGO	ENCLOSURE OF THE FINAL DRAFTS FOR NASNI TRC; COMMENTS TO BE ADDRESSED AT THE FOLLOWING TRC MEETING ON FEBRUARY 20, 1991 W/O ENCLOSURES	00005
12-21-1990		N.W. CLEMENTS		
LTR		VARIOUS AGENCIES		
0012				
N00246	001991	NASNI SAN DIEGO	FINAL DRAFT FOR THE TRC; COMMENTS FROM MEMBERS TO BE SENT TO NASNI NO LATER THAN 2/6/91; COMMENTS TO BE ADDRESSED AT THE TRC MTG. ON 2/20/91 W/O ENCLOSURE	00005
12-18-1990		N.W. CLEMENTS		
LTR		VARIOUS AGENCIES		
0015				

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N00246	001968	NASNI SAN DIEGO	INFORMATION FOR THE TRC FOR MEMBERS TO REVIEW FOR DISCUSSION PRIOR TO THE FIRST MEETING SCHEDULED FOR DECEMBER5, 1990 W/O ENCLOSURES	00005
11-16-1990		N.W. CLEMENTS		
LTR		VARIOUS AGENCIES		
0006				
N00246	001562	EPA SAN FRANCISCO	COMMENTS ON THE FINAL PERMIT PACKAGE AND THE PART B APPLICATION	00005
08-07-1990		T. CANADAY		
LTR		DHS LONG BEACH		
0012		M. SANDHU		
N00246	001272	SOUTHWEST DIVISION	STATUS OF INVESTIGATIONS OF THE IRP CLEANUP OF SITES	00005
07-07-1990				
MEMO		FILE		
0006				
N00246	001958	SOUTHWEST DIVISION	RESPONSE TO LETTER FROM EPA DATED MAY 23, 1990, ON RESULTS OF THE EPA PRELIMINARY ASSESSMENT/SITE EVALUATION (PA/SI) FOR NASNI	00005
06-25-1990		D. SAKAMOTO		
LTR		EPA SAN FRANCISCO		
0002		C. DOUGLAS		

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N00246	000016	JACOBS ENGINEERING	SAMPLING AND ANALYSIS PLAN SAP APPENDICES	00005
01-01-1990				
RPT		SOUTHWEST DIVISION		
0450				
N00246	000067	HARDING LAWSON ASSOC	SOLID WASTE AIR QUALITY ASSESSMENT TEST SITE 5 GOLF COURSE DISPOSAL AREA	00005
12-07-1988				
RPT		SOUTHWEST DIVISION		
0095				
N00246	000020	HARDING LAWSON ASSOC	SAN DIEGO SOLID WASTE AIR QUALITY ASSESSMENT TEST SITE 5 GOLF COURSE DISPOSAL AREA	00005
11-04-1988				
RPT		SOUTHWEST DIVISION		
0030				
N00246	000105	SWRCB	SWAT TO BE IN COMPLIANCE WITH ALL SOLID WASTE WATER QUALITY ASSESSMENT TESTS	00005
06-23-1987				
MEMO				
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N00246	000158	HARDING LAWSON	PRELIMINARY SITE INVESTIGATION SI CLUBHOUSE SITE	00005
08-21-1985		D.W. QUIGLEY		
RPT		SOUTHWEST DIVISION		
0049				
N00246	001505	NESSA PORT HUENEME	INITIAL ASSESSMENT STUDY	00005
09-01-1983				
RPT		NAS NORTH ISLAND		
0150				
N00246	000071	BROWN & CALDWELL	NASNI SAN DIEGO IAS INITIAL ASSESSMENT STUDY	00005
08-01-1983				
LTR		SOUTHWEST DIVISION		
0175				

ATTACHMENT C

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